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"I cannot help plead to my countrymen, at every opportunity, to cherish all that is manly and noble in the military profession, because Peace is enervating and no man is wise enough to foretell when soldiers may be in demand again."—GENERAL SHERMAN.

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**ARE DISAPPEARING GUNS ESSENTIAL TO THE
EFFICIENT DEFENSE OF OUR SEAPORTS?**

BY FIRST LIEUTENANT EDWIN R. STUART, U. S. A.,
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PRELIMINARY DISCUSSION.

THE fact that the sea-coast defenses of all nations comprise guns of all calibres up to a maximum of 12 inches or greater, is of itself sufficient evidence of the necessity for the different calibres in an effective defense. The rapidity of fire varies inversely with the calibre, but the decrease is not severely felt until a calibre is reached where it becomes necessary to use mechanical appliances for handling the ammunition. This is the case in calibres beyond the 6-inch, and marks the true division line between the rapid-fire and the heavy gun.

In the smaller calibres, the rapidity of fire is so great that any attempt to apply the disappearing principle *between shots* would so diminish the rate of fire as to greatly reduce the effectiveness of the gun. Furthermore, the number of men necessarily exposed in serving the gun is very small, and they may be sheltered from splinters, machine-gun and other small projectiles by shields. On account of the fact that the weight of the heavy gun is near the limit that may be manœuvred by

hand, a shield furnishing protection to the gun detachment cannot be satisfactorily used in this case.

A rapid-fire gun may be provided with some form of eclipsing mount, permitting it to disappear as a target when it cannot be effectively used as a weapon. During such period, it is wholly protected from all except accidental injury. The device by which this temporary disappearance is accomplished in the balanced pillar mount is so simple as to offer no objection to its use. In the elevated position of the gun, it differs in no wise from the ordinary pedestal mounting. This form of mount therefore offers no objection from a mechanical standpoint, and will protect from injury until needed such guns of the smaller calibres as cannot for any reason take an effective part in the combat. Its advantages cannot therefore be contested.

In those calibres requiring mechanical appliances for handling the ammunition, the interval between shots, and the consequent exposure of a large gun detachment, becomes so great that it is worth while to consider those mounts which will withdraw the gun *between shots* and allow loading under cover.

The various types of mount that have been used may be classified as casemate, turret, barbette, and disappearing. Of these, the casemate and turret mounts are so enormously expensive as to be eliminated from consideration in a defensive system so extensive as that of our sea-coasts must necessarily be, except for those special cases of restricted sites where an adequate defense can be provided in no other way, and their adoption is forced regardless of the cost.

For the 8-inch, 10-inch, and 12-inch calibres, the only types of mount available for general use, are the barbette and disappearing carriages, and these alone will be considered in this discussion, since one or the other must be used in present defensive constructions, and until something more satisfactory than either shall have been developed.

COMPARISON OF TYPES.

Both types of mount are possibly susceptible of improvement, but the present forms of the barbette and disappearing carriages will be considered in the comparison, which to be complete, must involve the following points :

Accuracy of Fire.

Rapidity of Fire.

Simplicity of Mechanism.

Protection to Gun and Detachment.

The Moral and Material Advantages of Concealment.

Cost.

In making the comparison it is necessary to assume that the guns are the same and that the system of ammunition delivery is capable of delivering ammunition as fast as needed.

ACCURACY OF FIRE.

The range- and position-finding systems necessary for firing at moving targets will be the same for both types of mount, and the difficulty experienced with each will be the same. The element of accuracy may be compared on the basis of a fixed target at a known range.

The barbette gun may be given any elevation and azimuth, and its errors will be due to causes beyond control in any gun; it is therefore as accurate as it lies within human power to make any weapon.

The disappearing gun, if laid indirectly, may be given any computed azimuth, but errors in azimuth will not be self-detecting, and errors in computation will result in a miss. If a sight be rigidly attached to the carriage at such elevation that the target will be visible, its azimuth laying will be as accurate as that of the barbette gun. This method has been adopted, but involves a slight sacrifice of concealment of gun position. The elevating mechanism may be set to give the piece an elevation corresponding to a given range. The gun will have this elevation when in a certain final position only, since the elevation is continually changing during the upward motion of the gun. This change is slow as the gun approaches the final position, and any variation possible in practice would be small. On account of the greater number of joints in the disappearing carriage, errors due to looseness of these joints would be greater than in the barbette gun. The disappearing gun has advantages which act directly to counteract this slight disadvantage in point of accuracy, as will be shown later.

RAPIDITY OF FIRE.

Assuming the ammunition delivered were needed upon the

loading platform, the mechanical operations of loading are the same, except that the shot for the barbette gun has to be hoisted by hand a distance corresponding to the total vertical motion of the disappearing gun, and the loading done on a small platform, while the disappearing gun comes down after its discharge, and the operation of loading is conveniently performed.

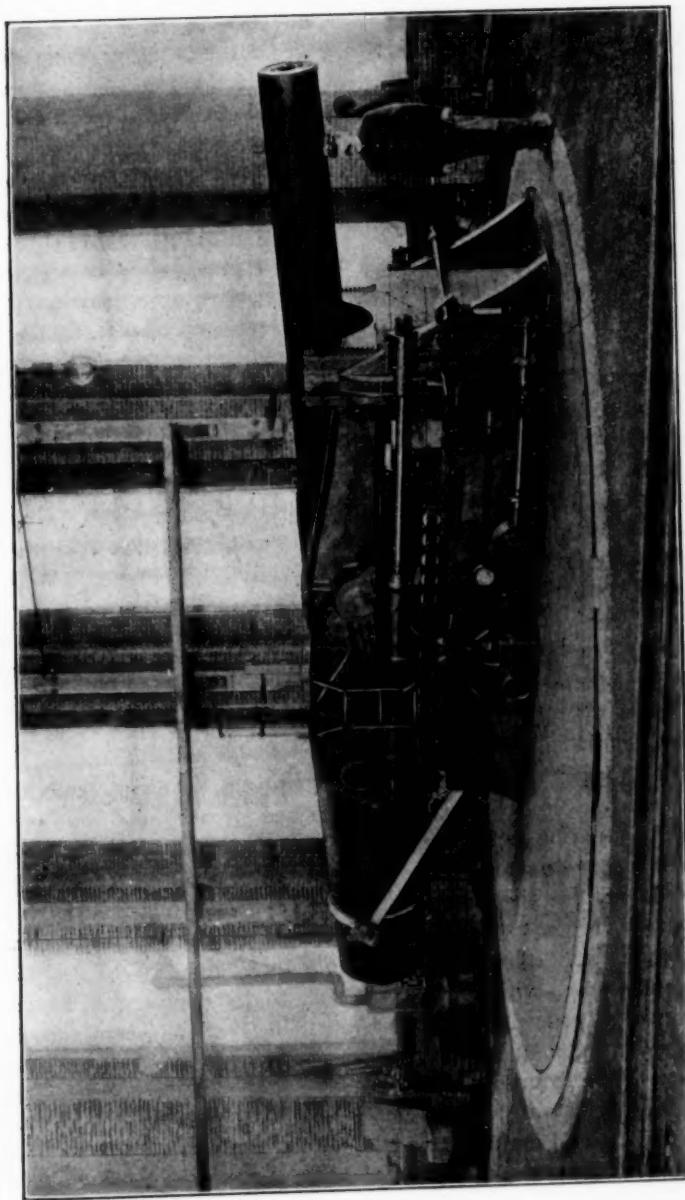
In a rapidity test of the disappearing gun, ten shots were fired from an 8-inch gun in 12 minutes and 21 seconds, and in 14 minutes and 42 seconds from the 10-inch gun. No similar data for the barbette gun has been found, but the report of the Chief of Ordnance for 1900 states that careful tests for rapidity of fire for 10-inch and 12-inch guns show that the rate of fire for the disappearing gun is about double that for the barbette gun, due to the causes previously given.

SIMPLICITY OF MECHANISM.

Excepting the balanced pair comprising the gun levers, gun and counterpoise, every part of the disappearing carriage is duplicated or represented in the barbette gun by a device designed to accomplish the same end. The complexity of mechanism alleged as one of the grave defects inherent to the disappearing carriage is largely one of appearance, and dissolves upon a rigid comparison of the two types of mount.

Each has its base ring, upon which rests a carriage provided with suitable turning gear. Upon this carriage rests upon live rollers in each type a chassis, whose motion is controlled by hydraulic recoil cylinders, with throttling bars, equalizing pipes and the attendant evils fully developed in both. Each has a retracting gear, and an elevating gear, mechanically satisfactory and suited to its purpose in each. On the chassis is mounted the gun in the barbette carriage, and in the disappearing carriage the gun levers, carrying at its extremities the gun and counterweight. No gun lever has ever broken in service; no carriage has failed through the presence of the counterweight, or given any trouble from this source except through carelessness, or mechanical defects corrected in the later types of the disappearing carriage.

Accidents to other parts of the carriage are equally liable to happen to both types. In practice, three disappearing carriages



10" B. L. RIFLE ON ALL-ROUND-FIRE DISAPPEARING CARRIAGE.

have been disabled for service through the bursting of equalizing pipes, but the pressure in the cylinders and equalizing pipes of the barbette carriage is very much greater than in the disappearing carriage, and an equal amount of experience with the barbette carriage would show a greater number of failures from this cause. Considerable annoyance has been caused, and a number of guns disabled for drill purposes, by the breaking of retraction chains, but this was not a serious difficulty, and has been obviated in later carriages by the substitution of wire rope for the retraction of the gun. Each carriage, as all other machines, requires daily attention to keep it in perfect order.

Even if the disappearing carriage be more complex than the barbette carriage, the increase in this respect is far less than in the other details of artillery defense.

No artilleryman advocates the return to a system of defense which would render unnecessary searchlights, electric light plants, a complicated system of range- and position-finding, an elaborate system of communication, and a more or less complicated system of ammunition delivery.

Moreover, through the initiative of the artillery, there has been recently transferred to it an adjunct of the defense,—the submarine mines,—with a large amount of delicate apparatus, a large amount of material which to be effective must be in perfect condition; difficult to install in service and still more difficult to maintain in serviceable condition; requiring technical knowledge and manual skill in marked degree, and involving many situations where errors, mistakes, or the slightest carelessness means disaster.

It is true that the most effective defense requires the submarine mines to be installed and controlled by the artillery commander. The responsibility for this defensive adjunct has been assumed without complaint as to its complexity, for the sake of a better defense. If the artillery cannot care for the heavy armament on disappearing carriages, a most valuable item of the defense of our seaports has been rendered useless by having been transferred to a branch of the service incapable of installing and maintaining it, for it may be stated without hesitation that men not capable of the degree of instruction necessary to handle successfully the disappearing gun cannot be de-

pended upon to install an effective submarine mine defense. The willing assumption of this defense is evidence of the belief of the artillery in their ability to handle the less complicated disappearing guns.

PROTECTION TO GUN AND DETACHMENT.

The degree of protection required can only be determined by considering the experiences of the past, coupled with experiments made under conditions which are not sufficiently near those of war as to be a true guide. The latter serve only to indicate what may be expected under present conditions of combat where forces are about equally matched.

The bombardment of Alexandria, San Juan, Santiago, the batteries in Manila Bay, and other earlier instances may be cited to show that no material damage can be inflicted upon fortifications or their armament by the guns of a fleet. The degree of protection afforded to guns in barbette mounts appear to meet the requirements of protection to material, even when opposed to modern guns. The same is not true of the gun detachments. Cases may be cited, as at Alexandria, where troops of poor morale have abandoned uninjured guns under the fire of vessels. The inference is irresistible that even troops of good morale will be severely shaken by the fire to which they will be exposed in future attacks on sea-coast fortifications, and the service of the gun in rapidity and accuracy will be materially affected by the losses which the bombardments of San Juan and Santiago show that the cannoneers of barbette batteries will suffer.

Interesting in this connection are certain observations of L. Alvarado, a Spanish officer who participated in the defense of San Juan against the bombardment of May 12, 1898. These are published in a translation in the *Journal of the United States Artillery* for March and April, 1900. The extracts are as follows:—

* * *

3d. Barbette batteries need at least 14 to 16 meters elevation. Low barbette batteries, unless in very especial positions cannot be fought if they are attacked with resolution by vessels which use the fire from their tops.

* * *

6th. Many officers are absolutely necessary in sea-coast batteries. * * * They are needed to preserve by their example the coolness and discipline of the men who have to stand firm under a fire from which they can shelter themselves by running only a few meters.

* * * *

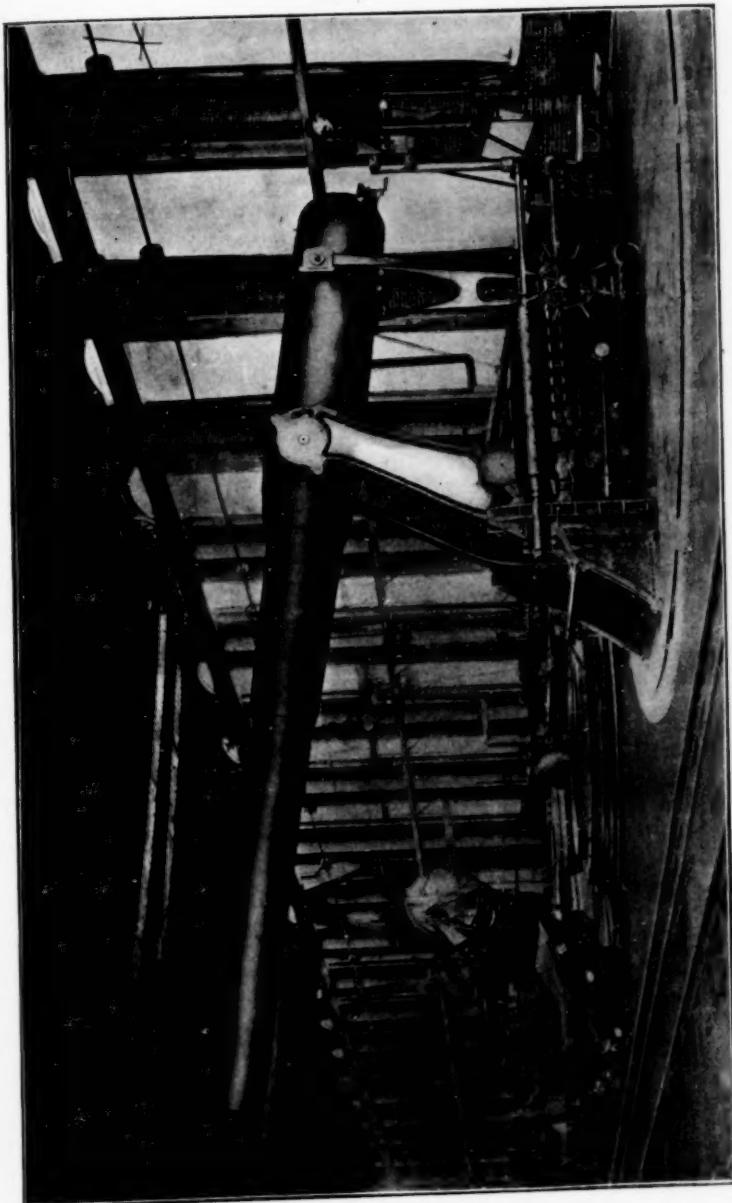
It seems useless to cite experimental firing when examples from actual war are available, but the French experimental firing at l'Ile de Levant in 1896, and the English experimental firing at Inchkeith about 1885, while showing greater results than were actually obtained later under war conditions, pointed clearly to what might be anticipated and was later realized, and justify citing the experimental firing at a dummy representing the action of a disappearing gun at Portland in 1885, to show that machine gun fire cannot harm the detachment serving such a gun, while poor practice by the heavy guns showed the demoralizing effect of the want of a definite target.

This firing comprised 6910 rounds of 1-inch and rifle calibre, 29 rounds from 6-pounders, fired at an average range of about 825 yards, and 15 shell and 13 shrapnel from 10-inch guns at a range of about 2500 yards. No damage to gun or detachment resulted from this firing. The weather conditions were not favorable, but the officers of the vessel engaged reported that the results would probably have been the same, even under more favorable conditions. Peace practice being more accurate than can be hoped for in war, it is evident that the fire of a fleet cannot injure a disappearing gun battery.

THE MORAL AND MATERIAL ADVANTAGES OF CONCEALMENT.

The barbette gun can be rendered inconspicuous by neutral colors, but the advocacy of such measures is an admission of the immense advantage of the total concealment afforded by the disappearing mount. By the use of the latter, the enemy has no visual means of determining the strength or location of the defenses. No definite target is presented except during a few seconds insufficient for aiming, and not much greater than the time of flight of the projectiles aimed at it.

Any gun out of ammunition or not actually engaged may be wholly removed from danger of damage by accidental shots by being withdrawn behind its parapet, and any gun slightly in-



10" B. L. RIFLE, ON ALL-ROUND-FIRE DISAPPEARING CARRIAGE.

jured may be withdrawn and repaired. The disappearing gun has also the advantage of concealing from the attack the nature and extent of any injury to the armament, while any damage to the attacking fleet is at once known to the garrison of the fortifications. The greater circumspection required in the attack of fortifications whose strength and condition remain unknown, will result in delay which will directly favor the fortifications by reason of the greater expenditure of ammunition possible to the latter.

COST.

The approximate cost of the emplacement, gun, and mount for the different calibres is

8-inch	{	barbette	\$55,600
		disappearing	\$72,000
10-inch	{	barbette	\$74,200
		disappearing	\$99,300
12-inch	{	barbette	\$118,800
		disappearing	\$141,000

It has been previously shown that the rate of fire of the disappearing gun is about double that of the barbette gun. While information from different sources does not give the same cost for the different types of emplacements, the ratio of cost is about the same, and may be assumed as 3:4 in favor of the barbette gun. The actual cost of installation for a given intensity of fire is therefore in the proportion of 2:3 in favor of the disappearing gun. To deliver the same volume of fire from barbette guns would require double the number of gun detachments. Since a certain intensity of fire is the consideration governing any project for defense, the relative cost of obtaining this intensity of fire by the use of the different types of mount is of interest, and would be as follows:—

Four 8-inch barbette guns can be mounted for about \$222,400. These guns (assuming double the time quoted in the rapidity test of the disappearing gun) could fire four shots every 2 minutes and 28 seconds, or 96 shots per hour for the four guns. Three 8-inch disappearing guns can be mounted for \$216,000. These guns can fire three shots every 1 minute and 14 seconds, or 135 shots per hour for the three guns.

The ability to fire 96 shots per hour from 8-inch guns, rat-

ing interest at three per cent., represents an annual outlay of \$6600, and requires four gun detachments of about ten men each. The annual cost of each gun detachment is about \$3000, counting the pay and rations of each soldier at an average of \$25 per month. The total annual expenditure representing the ability to fire 96 shots per hour is therefore \$18,600. The annual cost per shot per hour from 8-inch barbette guns is therefore approximately \$194.

On the same basis, three disappearing guns, representing the ability to fire 135 shots per hour, involve an annual outlay of \$15,480, or approximately \$115 per shot per hour for the disappearing guns. The annual cost of maintaining an effective defense using barbette guns will therefore be nearly 1.7 times as great as for an equally effective defense using the disappearing guns.

This relative annual cost will vary with the absolute numerical strength of the garrisons maintained, but will always be decidedly in favor of the disappearing gun.

SUMMARY.

For rapid-fire guns, the ability to disappear when not needed is obtained by means so simple as to offer no objection to the use of a type of carriage which gives the ability to do so.

For heavy guns, the disappearing carriage secures at less cost per annum all the advantages of concealment and protection to gun and the detachment serving it, by the use of a mechanism apparently complex and liable to get out of order, and involving a slight sacrifice of theoretical accuracy. The complexity of mechanism exists largely in appearance, since a rigid comparison of the barbette and disappearing carriages shows all the dangerous elements of complexity to be equally existent in both, and the hydraulic pressure in the cylinders and equalizing pipes greater in the barbette than in the disappearing carriage. The most serious accidents that have happened to the disappearing carriages so far have been due to the bursting of the equalizing pipes, an accident more liable to happen to the barbette carriage than to the disappearing.

The sacrifice in theoretical accuracy in the disappearing carriage is more than compensated by the protection afforded to

the gun detachment, which will allow the service of the gun to proceed without the demoralization incident to the losses which experience shows must be suffered by the detachments serving barbette guns.

For a smaller first cost, and a smaller annual expenditure, the disappearing gun will protect our seaports in time of war as efficiently as the barbette gun, and return to their homes at its close many men whose lives would be sacrificed if exposed in the open emplacements of barbette guns. An effective defense must be provided, but that can be accomplished by the use of disappearing guns, and the Government owes it to its defenders that their lives shall not be needlessly sacrificed.

The installation of guns on disappearing carriages in the past has been based upon sound principles, and the best defense of our sea-coast requires that it shall be continued.

(CRUSTACEAN.)

ARE DISAPPEARING GUNS ESSENTIAL TO THE EFFICIENT DEFENSE OF OUR SEAPORTS?

BY CAPTAIN WILLIAM R. HAMILTON, U. S. A.,
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THE defense of the coast is sought by means of the offensive action of ships of war, primarily ; by the defensive action of guns in fortifications on the land, secondarily ; or by a combination of the two. In our country we must perforce use both means, and the subject of Coast Defense should therefore be divided into two parts, viz. :

1. Mobile Defense, or that of war ships.
2. Stationary Defense, or that of fortifications.

Under the first head belong all classes of war-ships operated by sailors, and designed to carry offensive action wherever necessary. Under this head are included not only battle-ships, cruisers, torpedo boats, but transports for troops and munitions of war also. From their very nature they must act on the offensive to be successful ; *i. e.*,—they cannot be tied down to single ports or harbors.

Under the second head belong the fortifications located on the coast, their guns, submarine mines, and all accessories designed to defend against attack of harbors, channels, or other valuable or strategic place on the dividing line between the sea and shore. Necessarily from their nature, they are tied down to the locality in which they are located, and their sphere of action is limited to the effective range of their guns.

Both these classes are absolutely necessary in our country, and neither possesses any relative importance above the other. To maintain and extend our commerce and trade, to punish insulters in foreign seas, to cause our flag to be respected on distant shores a navy is necessary. But battle-ships require dock-yards and arsenals and store houses, and commerce and trade builds up large and important cities on the coast, and to offer harbors of refuge for ships, protect and defend dockyards, arsenals

and cities, fortifications are just as necessary. In an article on "The War on the Sea and its Lessons," Captain Mahan says :

" It is proper here to say, for the remark is pertinent and most important, that coast defenses and naval force are not interchangeable things ; neither are they opponents, one of the other, but complementary. The one is stationary, the other mobile ; and however perfect in itself either may be, the other is necessary to its completeness. In different nations the relative consequences of the two may vary. In Great Britain, whose people are fed from the outside world, the need for a fleet vastly exceeds that for coast defenses. With us, able to live off ourselves, there is more approach to parity. Men may even differ as to which is the more important ; but such difference in this question, which is purely military, is not according to knowledge.

" In equal amounts mobile offensive power is always and under all conditions more effective to the ends of war than stationary defensive power. Why then provide the latter ? Because mobile force, whatever shape it takes, ships or men, is limited narrowly as to the weight it can bear ; whereas, stationary force generally, being tied to the earth, is restricted generally in the same direction only by the ability of the designer to cope with the conditions. Given a firm foundation, which practically can always be had, and there is no limit to the amount of the armor, mere defensive outfit be it wood, stone, bricks or iron, that you can erect upon it ; neither is there any limit to the weight of guns—the offensive element—that the earth can bear, only they will be motionless guns.

" The power of a steam navy to move is practically unfettered ; its ability to carry weight, whether guns or armor, is comparatively very small. Fortifications on the contrary, have almost unbounded power to bear weight, whereas their power to move is *nil* ; which again amounts to saying that, being chained, they can put forth offensive power only at arm's length, as it were."

" Thus stated, it is seen that these two elements of sea warfare are in the strictest sense complementary, one possessing what the other has not ; and that the difference is fundamental, essential, unchangeable—not accidental or temporary. Given local conditions which can be found, greater power, defensive and offensive, can be established in permanent works, than can be brought to the spot in fleets. When, therefore, circumstances permit ships to be squarely pitted against fortifications—not merely to pass swiftly by them—it is only because the builders of the shore works have not for some reason, possibly quite adequate, given them the power to repel attack which they might have had. It will not be asserted that there are no exceptions to this, as to most general rules ; but as a broad statement it is almost universally true."

* * *

" Thus deficient coast protection reacts unfavorably upon the war

fleet, which in all its movements should be free from any responsibility for the mere safety of the ports it quits." * * *

In short, if war fleets can leave the home ports, knowing that they are effectively protected by the shore defenses, they can act in turn effectively, well knowing that which is left behind is well protected, and that in case of mishap either by battle or elements, they have a safe refuge to which to flee for refitting and arming again for renewed battle.

From the very nature of the subject of this essay, there is no need of any discussion of the mobile coast defense, except so far as to consider what may be brought against guns ashore. We will therefore conclude this part of the subject by remarking that the ideal defense of a coast is a vast naval fleet, so superior in strength, numbers, skill and armament, against any combination of fleets that might be brought against us, that it would not only cover all our harbors, channels, etc., with a sufficient number of vessels to adequately protect them, but leave a still further number to act offensively in any part of the world. And that such a fleet would be so costly, both in initiating and maintenance, that it would soon bankrupt the nation, and therefore would not be tolerated even in thought. The defense of our coasts rests in the fortifications, the guns therein, and the mines of adjacent waters. All discussion in this essay refers entirely to the fortifications erected on the coast line of the United States, and assuming this condition, we pass on to the query,—What is Sea-coast Defense? And following closely in its train, will naturally come the following queries: Where are such defenses placed and what condition govern their location, and strength, and character? Upon the character of the special defense determined, depends the nature and strength of the armament, and when we have proceeded thus far, we are then ready to discuss understandingly the guns and mounts required for thorough efficiency for the desired work.

By coast defense is understood all means of war used to protect the maritime frontiers of our country, with the special duty of guarding all approaches to rivers and harbors and other channels whose possession would be of value to an enemy, and a loss to us. This defense comprises fortifications with emplacements for both large and small guns, and all means of obstruct-

ing channels, and of working guns and mines, both by night and day. Its special object is to prevent attack directly by warships, or attack by bombardment, and while a proper prudence will dictate also, means to prevent attack by landing parties and by land, yet the actual landing of a body of troops of sufficient size to do any considerable damage, is so remote a contingency, is fraught with so much danger to the attackers, and attended with so many difficulties, that we may dispense with it in this discussion. Hence, all attack will be considered as coming from the sea.

WHERE ARE SEA-COAST DEFENSES PLACED?

The United States has a maritime frontier of about 5000 miles on the Atlantic, the Gulf and the Pacific. This does not include Alaska, the Great Lakes, or our new possessions in either the West Indies or the East. The coast of the Gulf States and those bordering the Atlantic as far north as New York presents few harbors of sufficient depth to admit heavy war vessels. It is a low-lying sandy coast, with the majority of its cities and towns somewhat removed from the coast proper. But from New York northward, the character changes to one of bold and high eminences, with many good harbors and channels sufficiently deep to admit the heaviest battle-ships to the very wharves of the many populous cities on its shore. On the Pacific the line is even bolder, and guarded almost to its edge by mountains. Here few harbors are found, but they are deep and commodious. Quoting from General Abbot on this subject, we find that :

"Upon the whole extent of the Atlantic, Gulf and Pacific coasts there are about thirty ports which demand local protection for their cities now exposed to occupation and destruction, and of these about a dozen are so important as centres of commercial wealth that the entire country has much at stake in their security. Nine out of this number are also important as containing naval stations and depots of supply, without which our new ships of war would be unable to keep the sea or perform any service in war; for it must not be forgotten that naval bases are as indispensable in these days of steam as are bases of supplies for armies in the field. In fact, this statement hardly puts the matter strongly enough, for our new ships of war would be exposed to capture and use against us, if they should attempt to operate on their natural element, the ocean, without ports of refuge in which to find security when over-matched."

"Besides these thirty ports now urgently demanding protection, there are about seventy others whose local importance would justify inexpensive earthworks." * * * "In fine, our true policy for coast defense is to fortify the chief ports along our coasts, so as not only to protect the chief cities and arsenals against insult, but also to provide safe refuges for our coastwise marine, and safe naval bases with coaling stations, depots of supply, and places of refuge for our ships of war when threatened by superior forces on the ocean, whence they may issue to act offensively, as circumstances permit."

Works of coast defense are therefore required to :

(1) Prevent passage of war fleets through narrow channels that would enable them to successfully attack cities and important places.

(2) Prevent the bombardment of cities and important works from beyond our outside.

(3) Prevent the occupation of harbors or the passage of channels, which without having cities or important works located on them, may nevertheless lead to land-locked bays, sounds, or rivers. Wherever any of the foregoing conditions exist, there should be placed Coast Defense works, which with their armaments, will vary according to surrounding local conditions.

What conditions govern the location, strength, and character of Coast Defense works ?

The location of works must depend upon the vicinity of the city, arsenal, harbor, or other place it is built to defend, upon the nature of the terrain or ground, upon the width, depth and form of channel, harbor, or other waters from which an enemy may issue, and upon local conditions of climate, storms, soil, etc.

In choosing the location for coast works, we are obliged to consider the commercial and political development of the port it is to defend, which may or may not become a strategic point, necessitating the building of a stronghold, though not well adapted to defense. Commercial development has caused many cities to spread out beyond the original boundaries desired for them, and in fact in some instances military development has brought about this very end, so that close to the fort or battery is a part of the town or city. This did not matter a half century ago, when means of attack were limited to ranges that

could be easily calculated by the eye, but in these days of accurate long range guns, we often find almost upon the coast, great and important commercial works, built for trade and commerce, but unsuited for defense. Still such defense cannot be dispensed with, and to keep a fleet from bombarding such a location, makes another difficulty in building a proper defense work. Thus the vicinity or proximity of the city, arsenal, or port, has a very important bearing on the location of the defense works. If the waters of the channel to be covered by the works, is a narrow, tortuous one, or shallow, or filled with shoals or rocks, it may also be easily understood that only lighter vessels would attempt to force such a passage, and they being in general armed with lighter guns, it follows that the location of the works would have to be considered with reference to such fire as an enemy could bring upon the works. Again, the entrance of the channel may be lofty and bold, so that a few guns placed upon the summits would entirely bar the passage of vessels. Or, it may be low or even covered with water, as a shoal, etc., all of which will have an important bearing on the proper and best location of the defense works.

Fortunately with us, there are few important cities, outside of those on the great lakes, that are built directly upon the shore, and our engineers have been able to find in all places, so far, advanced sites for locations of all necessary defenses.

The character of coast defenses must depend in generally upon the nature of attack to be expected (Abbot), and specifically upon local conditions. If danger is anticipated of attack by land, or of an immense army debarking on land, then works must be constructed as to withstand not only attack from the sea, but from the land also. This latter condition necessitates provision for sustaining prolonged sieges and bombardments. Such a condition we do not, as before remarked, consider possible in this country. Hence, as we may anticipate attack by sea only, our coast works are built accordingly. In order that the greatest amount of fire may be concentrated on any one unit of an opposing fleet, and at the same time the enemy be compelled to scatter his fire, our works must be built in a number of detached batteries, widely spaced, and as far as possible concealed. Such batteries will rarely have more than four guns

of heavy calibre, or less than two. They must be properly flanked and such disposition made of rapid-fire guns as will not only insure their use as flanking guns, but also for the more important rôle of covering mine fields and the closer water approaches. Local conditions will determine not only the specific character but also the strength of the works or batteries. All authorities on this subject lay down the general principle that coast defense works are built for (1) Preventing passage of war fleets, (2) Preventing bombardment of cities, arsenals, etc. (3) Preventing occupation of channels, land-locked bays, wide-mouthed harbors, etc. The two methods of coast science adapted for this prevention are the use of high-power guns, and the obstruction of channels by mines or other obstacles.

It is in the proper selection of sites for his guns, that the engineer finds his greatest difficulties, and has his greatest opportunities of displaying his professional abilities. The general topography of a location will exert a governing influence on the character of the work to be erected, and inasmuch as the armament in turn depends upon the nature of the work as well as other conditions to be discussed later, it is opportune here to discuss more in detail the influence of site upon the nature of works and their armaments.

It may be remarked first that in selecting a site, the engineer has the great advantage not possessed by the enemy, of indicating his own battle-field and building on it accordingly. On this point, we again quote General Abbot:

“A land fortress chosen in advance may usually be passed, and the battle be forced beyond reach of its guns. On the approaches to a land-locked water route, nature provides only a few channels where ships can move, and that particular site for defense can be chosen by the engineer where they will operate under the maximum disadvantages, and yet where they must certainly pass to effect their object. This is the answer to the common fallacy urged by advocates of floating batteries, that land guns are chained monsters, while guns afloat may be shifted to meet the enemy wherever he appears. This argument fails doubly. He should be compelled to fight where we have every possible advantage; and the guns should be sure to be in position when wanted. Mobility implies the possibility that they may be drawn away by the skilled manœuvres of the enemy and the channel be left uncovered at the critical moment. Moreover, a land armament is not exposed to ramming or torpedo attack, while a coast defense fleet is as likely to suffer

in this manner as the enemy himself. * * * To forbid to an enemy the occupation of a harbor useful for his purposes is a simple operation. It only requires few modern mortars in a battery suitably designed to facilitate accuracy of fire and well protected against the operations of a landing party. Should we become possessed of foreign coaling stations, this plan, with appropriate local modifications would probably meet all needs." (It is more than seven years ago that General Abbot wrote his article, and since then his prophecies have been strangely verified. The full and complete experiments at Preble, Maine, last fall, have demonstrated thoroughly the value and reliability of mortars, while the number of coaling stations now possessed by the United States is beginning to circle the earth). "The increased range of modern ordnance has rendered possible a somewhat new application of land batteries to the defense of the coast. There are certain entrances to large inland waters, like Long Island Sound and Puget Sound, which are too wide to be properly closed with land defenses alone, especially as the depth and strength of the current forbid the effective use of submarine mines. Here there will be great advantage in reinforcing land fortifications with armored coast defense vessels and torpedo boats." * * *

The elevation or site of a coast defense work determines in all cases to a certain extent, and in many to a very great extent, the nature of the arm to be used, its calibre and kind of mount. Hence it is necessary to study it carefully. In a most interesting and authoritative article on the "Elevation of Sites for Batteries," Major J. G. D. Knight, Engineer Corps, deduces as a result of many examples, the conclusion that it is not probable that a naval attack on land batteries will be entered upon at distances exceeding 5000 yards. The article in question was written six years ago, and later developments occurring during the Spanish-American War make it conclusively certain that attacks on land batteries cannot be opened at ranges exceeding 3000 yards with any degree of effectiveness, except in the one case where a fleet may lay at anchor and attempt from a long range to bombard the work. This, however, is the one case that shore authorities consider as least fraught with danger or harm. In other words, the danger to be feared by such bombardment on a city, dock-yard, or harbor densely occupied, at ranges exceeding 5000 yards, is *nil*, and an enemy would not be justified in expending the large amount of ammunition necessary to consummate it, except in the one case where he was really executing a diversion or attempting to keep the shore batteries so occupied as to lead them from his real objects of attack. Major

Knight presents two tables which are quoted herein, giving the angles of fall of projectiles of 8", 10" U. S. A. guns and the 40 cm. Krupp gun, all rifled breech-loaders, as computed from the tables of curves of the Engineer Board. The second table gives the heights at different ranges, giving corresponding reductions of the angles of fall of arriving projectiles, with the corresponding increase of protection (vertical) of loading detachments at 45 feet in rear of the crest of the parapet, and on a level of the loading platforms:

TABLE I.

Ranges, yards.	8"-guns.	10"-guns.	40 cm.-guns.
1000	0.7	0.8	0.6
2000	1.5	1.8	1.6
3000	2.6	3.0	2.5
4000	3.9	4.4	3.7
5000	5.7	6.1	4.9
I. V. per sec.	2160	1960	2035

TABLE II.

Angle of fall diminished in degrees.	Theoretical increase of protection (vertical) in inches, 45' from crest.	At ranges in yards			
		1000, 2000, 3000, 4000 ele. in feet above ships guns.	105	157	209
1	9	52	105	157	209
2	19	105	210	314	419
3	28	157	314	472	629
4	38	210	420	629	839
5	47	262	535	787	1050

From the foregoing tables, remembering that effective ranges are not beyond 5000 yards, it follows that guns mounted on the Buffington-Crozier carriages, after recoil,—the gun not being fired with an angle of depression, lies wholly below a plane which passing through the interior crest is depressed 7°. This plane passes 5'-11" above the front edge of the loading platform and 4'-3" above the rear edge of loading platform. Now, according to the table the greatest angle of fall for projectiles for a range of 5000 yards is given by Table I, as 6.1°; it follows therefore that since the rear of the gun when drawn from battery, that is, when in its loading position, is less than 5' above the platform, that neither gun or carriages will be struck by projectiles passing above the interior crests. This is good for all ranges of 5000 yards or less, and even where the crest of the land battery is on the same level of the attacking naval battery. Since the chances of projectiles striking just

above or grazing the interior crest are almost *nil*, it follows that the protection afforded men serving the gun is ample. They are almost entirely covered. So also will the same be apparent with guns mounted on the gun-lift disappearing principle. But where guns are mounted in barbette, that is, on non-disappearing carriages, both guns and carriages and necessarily also the loading detachments, being above the level of the interior crests, are exposed as plainly to the enemy's fire as if on sandy beach without any parapets in front of them.

Although the danger from fire is little in the cases just cited, still there being some, we next inquire by the second table what effect the elevation of the site will have on the fire. Major Knight calls this "the searching effect of projectiles and the elevation of site that will neutralize this effect." As we increase the elevation of a site, the angle of depression for its guns must also increase, until finally when with the 8" gun the angle of depression is 5° , the platform of the gun is relatively 11 inches higher to the interior crest than when the gun is fired without depression, while with the 10" gun it is 12.5 inches. Of course when vessels are 2000 yards or more distant, no moderate increase of elevation will give corresponding increase in protection. Hence by Table II, a vessel 1000 yards away firing at a battery that is 262 feet high, above sea-level, since the protection afforded at 5° depression is but 35 inches and 36 inches respectively for 8" and 10" guns, at 45 feet in rear of crest, this protection being the net increase, it is seen that there is but little chance of hitting any of the detachment, even on extreme rear edge of platform. But if the range be double, or more, then the crest elevation should also be increased in like ratio, so as not to obtain more than 36 inches increase. This is evident since each increase in elevation of interior crest requires the loading platform also to be raised so much nearer the level of the crest that the required angles of depression may be obtained. Were this not so, there would be between the walls of the battery and the nearest spot the projectiles of its guns would strike the water a dead space, much out of proportion to the increase of elevation. A projectile, by Table II, having an angle of fall of 1° and clearing the interior crest, will at a distance of 45 feet from crest, pass nine inches below the level of

the crest when fired at a range of 1000 yards. For ranges of 2000 yards the angle of fall will be 2° , and projectiles will pass 19 inches below the crest, and to neutralize this fall the elevation of the site must be 210 feet. When a projectile is fired from 5000 yards, and has an angle of fall of 5° , it will pass 47 inches below the crest, and to neutralize this the site must be over 1000 feet high. But while by raising the site we have gained a great protection to guns and detachment, we have also gained in the searching power of the guns. A 10" rifle, whose interior crest is 300 feet high, will have a dead zone of 1000 yards radius, but if we raise the same gun to 210 feet elevation, then the dead zone becomes 720 yards radius.

Major Knight asserts that a gun mounted on either of the three disappearing plans—the gun-lift, Buffington-Crozier, and Gordon carriages, will not be directly hit when under direct fire of guns at ranges not exceeding 5000 yards, and therefore that the additional protection is slight and really unnecessary for guns so mounted and is practically nothing for non-disappearing barbette guns. Also that increase of site increases dead zones, and therefore that moderate elevations are best. Furthermore the loading platforms of barbette guns on non-disappearing carriages being on practically the same level as the interior crests, no elevation of site affords commensurate shelter to gun, mount or detachment. There is one advantage gained by elevation of site, for disappearing guns, which he distinctly mentions, and that is expressed by him as follows :

"With nothing but the parapet continuously in the enemy's view, with guns appearing only for brief periods, he must be at a loss how to direct (the enemy) his fire if he cannot see the openings into which the gun disappears. Therefore with the view of depriving an enemy of a definite target for his guns, the battery may well be constructed at sufficient elevation to hide the openings of its emplacements from view from the tops of an enemy's vessel. For this purpose, and for this only, it may be well to give crests of batteries an elevation of about 100 feet above the water."

But are there not disadvantages of low sites, which would make necessary the higher elevation? It is claimed that a low site enables the ships to dispense with high angles of fire, for which their decks and gun-mounts are not fitted, and it is further said that a low mount on shore does not enable the shore gun to

throw a fire on the deck of a ship which as well-known is her most vulnerable point. Again it is claimed that a low site gives to the naval attack a distinct advantage, placing its guns on an equality with the shore guns as to energy of impact. For the first objection it may be said that for the same ranges the angles of fall of ship guns is increased but very slightly over those of the shore guns. Against the second point, it is well known that ships have been unable to give angles of elevation of over 14° or 15° to their guns, while for the third an example taken from Ingalls' hand-book of Exterior Ballistics may fully answer. Thus a 714 lb. shot fired from a ship at a range of 3000 yards at an elevation of 1270 feet, while another fired from the battery at the 1270 foot elevation, with same weight projectile, the striking velocities would be 1474 and 1517 feet respectively, while the respective striking energies would be 10,754 and 11,390 foot-tons, or the vessel would have but 636 tons handicap. In other words the shore gun has gained but 3 per cent. of energy by reason of elevation, and since a blow of 11,000 foot-tons would not damage at that distance the steel deck of a ship, it is hardly probable that an addition of 400 foot-tons would enable it to do so. Major Knight sums up his splendid article as follows:

"Assuming that vessels will not attack shore batteries at greater ranges than 5000 yards, barbette guns mounted according to the U. S. disappearing methods, need no additional protection derived from increasing the elevation of battery sites within reasonable limits. Even moderate elevations of batteries, which are armed with guns limited to depression of 5° , entail dead zones of magnitude not to be overlooked where these zones include areas of deep water. Disappearing guns gain but little additional protection by such increase in the battery elevation, and non-disappearing guns gain practically no additional protection."

Notwithstanding these excellent arguments, the writer of this essay being an artilleryman, is not prepared to coincide with the conclusions. The fact is admitted that site gives additional invisibility to the guns on shore, for every foot of elevation is a most distinct and valuable advantage, when applied to the disappearing guns. But in addition it must be said that every foot of height gained renders the gun more accurate, by reason of the target being virtually larger, while at the same time deck attack is easier and more certain. Beyond this, where elevations for batteries are low, those for the depression

range-finders of the respective batteries, must also be low, and therefore the errors from this source must increase. Ranging of guns is not possible by any system of depression range-finding where the vertical base is under 50 feet, and accuracy cannot be depended on absolutely till the height is at least 90 feet. So far, no horizontal range-finder has been adopted that will satisfy all artillery conditions so thoroughly as the depression instruments. High sites for fire commanders and battery commanders' stations are almost a necessity, since ships can be sighted at greater ranges and preparations for fighting them made accordingly. Thus, at a height of 600 feet in clear weather, the water line of a vessel is visible with a good glass, a distance of 20 miles, and smoke coming from the same vessel is visible 10 miles farther. If the vessel is coming on at a 14 knot speed, this will allow two hours to prepare for it. Modern guns have much flatter trajectories than our old muzzle loaders, yet in the hey-day of their existence those on Porter's fleets could not damage the guns of the Confederate batteries at Port Hudson and Vicksburg, although the elevation of these latter was about 100 feet. The flatter the trajectory, the less the angle of fall, and hence, modern guns at short ranges cannot attain the rear of parapets of moderate height, while the higher the site, the greater must the range of the ship be to do any damage to the works or detachments back of the shore batteries. The high site is not so easily rushed by shore or landing parties. That the target becomes greater, the higher we ascend, is readily seen, since the beam of a ship is always greater than its freeboard, and while we lose but little of the latter, we gain much of the former. But that elevation affects the errors of aiming or firing is not so plain. If we suppose a gun fired at any given range at a target on the same level with it, and presume the shot to pass fifty yards beyond the target, it is evident that raising the gun fifty feet and firing under exactly the same conditions as before, that the shot must strike so much nearer the target, since with the same charge of powder and the same conditions, the range of the shot is exactly the same. Now, since the most important thing about sea-coast firing is to obtain accurate ranges, and since range-finders and instruments used in communicating ranges may give out at the critical moment,

it cannot be doubted that the elevation of a site when high, will give to the shore greater advantages than when low. In conclusion, we may sum up that a high site is always to be chosen, provided the area of fire covered by its batteries is not restricted thereby.

In placing guns in a battery chosen, there are two main objectives to bear in mind. The first is that guns are placed there to prevent vessels from passing by, in other words, to fire at vessels in motion.

The second one is that they are placed there to prevent bombardments, that is, to fire at vessels at anchor.

In the first case vessels may run by without firing or they may pass, in keeping up a systematic attack on the fort. In the second case vessels may anchor at close range in the hope of crushing or silencing the forts by a systematic attack and heavy fire or they may anchor at long range, and bombard while other ships attempt to pass by, thus hoping to draw the fire of the batteries on shore. Or, at any range they may attempt to crush the shore batteries by a heavy fire.

Bearing these two objectives in mind, we readily understand then that guns are distributed according to their class and calibre, as follows :

First,—At those points where navigation is most difficult for an enemy, the most effective fire must be brought to bear.

Second :—To render the position of a ship untenable, we must cover with an effective fire, all waters in which she could lie and do any damage either to the shore batteries, to shipping in the harbor, to dock-yards, cities, etc. In some cases one condition must yield to the other, and then the first must be supreme, but in the majority of cases, the two may be combined. These are tactical questions that do not come within the scope of this essay. The guns having been generally determined upon, then follows the question of their mounts, and as this is really the subject matter of this essay, all that has been written so far, being necessary to lead up to it in an understanding manner, we must first lay down the different systems of mounting guns.

The various classes of mounts for heavy guns may be classed under three heads, viz.:

1. Where complete protection is afforded both gun and its carriage and detachment, except for the brief moment the gun is exposed while firing, and limited only by the size of port through which it is withdrawn.

2. Protection to carriage and detachment at all times against direct fire and to gun, except for brief moment of firing. This method exposes gun and detachment to vertical fire.

3. Varying protection against direct fire, by shields, etc. No overhead cover.

Major G. S. Clarke, R. E., gives as separate groups of the three classes thus named, the following sub-divisions:

CLASS I.

1. Shielded casemates. 2. Curved front shielded casemates. 3. Continuous iron front. 4. Gruson Battery. 5. Non-recoil gun. 6. Turret. 7. Compound armor cupola. 8. Gruson Turret.

CLASS II.

1. Open battery with shields. 2. Open battery with earth embrasures. 3. Barbettes. 4. Light cupolas. 5. Breech hoods with barbette guns. 6. Barbette with turntable and horizontal splinter roof shield : loading performed at elevation, the breech being depressed through an opening in the shield.

CLASS III.

1. Moncrieff counterweight carriages. 2. Hydro-pneumatic carriage. 3. Counter-balance disappearing carriage. 4. Floating platform. 5. Balance pillar.

The names given the foregoing classes of mounts very generally explain their manner of action. In the United States our old forts very generally follow in their casemate protection, the groups 1 and 2 of Class I. Turrets have been suggested for certain of our fortifications, and this part of the subject will again be touched upon. The special advantages claimed for this class of gun mounting are complete protection to mounting and detachment against the heaviest projectiles, limited only by thickness of shield adopted, strength of masonry, and size of fort. Also complete protection against high-angle fire, and except at the embrasure in front, against machine-gun fire and shrapnel. Generally requires the occurrence of several hits in a small area to produce much result. Closest approximation to armor-clads. With the turrets and cupolas, the curvature is generally unfavorable to projectiles, and makes small target.

The general disadvantages of the class are to keep within bounds of moderate cost, entails the crowding of guns, which is always undesirable. For casemates, generally, the target often is large and exposure increased by massive overhead protection. Liable to cumulative danger at long range, and is most effectively attacked by the same projectiles which the ship requires to engage armor-clads. Field of view is restricted by small size of port, and a single shell entering is sure to disable carriage. Elevation and depression is limited. With turrets, a single segment broken, an entire turret is hopelessly disabled. Moreover, they are excessively costly. A great deal of complicated machinery is necessary in the turrets, while within space is cramped.

Under Class II. come the varying subdivisions of barbettes, which may be found in the United States in all the old styles of water batteries, and the upper tiers of batteries in the masonry forts.

The advantages derived from this class are, first, the great economy over other methods. All around fire and where hoods or shields are used, protection against machine guns and small calibred rapid-fire gun-fire. Simplicity in mountings, making manipulation of carriage easier; capable of any elevation, and depression limited only by slope of parapet. The disadvantages of this class are that the gun is, at all times, more or less exposed. No overhead covering, and detachment and carriage exposed. In the turntable barbettes, as great and intricate machinery is required as in the turrets. Guns and carriages increase the target offered to the enemy.

The Class III. comprises the various forms of disappearing gun-carriages. The advantages claimed are protection to gun, carriage, and detachment, except to the former at the moment of firing. Can be rendered by smokeless powder practically invisible, and when degree of protection and range of fire is considered, they are economical mounts. All loading, elevating and traversing done is always under cover, and is particularly well suited to guns on low sites; allowing great field of fire, and angle of elevation and depression, limited only by slope of parapet. The disadvantages stated are, first, the constant and special care required in maintenance in good and serviceable condition,

danger from overhead fire, complicated machinery, and danger of being disabled by splinters, and even dust, sand, etc.

A study of the foregoing systems will result in bringing down the various classes to the three simple ones of: first, Casemate mounts; second, Open barbette mounts; third, Disappearing barbette mounts. Taken in this order, they are all in use to-day in the United States, and while the various subdivisions of turrets, cupolas, etc., are suggested, they have not had so far any test of experience or use. As against wrought iron or steel plates, we can calculate with accuracy the result of shots of given weights and velocities, and our experience in the Civil War has given us greater knowledge of the effect of shot on earthen parapets, perhaps, than is the case with other nations. But beyond all question, the results of the wars of the past decade, the revolutions in Brazil, the Japanese-Chinese War, the Spanish-American War, and the Chinese War, have most conclusively proved that sea-coast guns mounted behind any kind of parapets are practically safe from the fire of naval guns. The magnificent fleets of the American navy in overpowering numbers at San Juau, at Santiago, and other Cuban ports, directed well-aimed fire at old earthen and masonry embankments, constructed a century ago, and succeeded only in silencing for the time being the fire of the old Spanish guns, few in number and poorly served. On the cessation of the American fire the Spanish artillery invariably resumed action with their guns, they and their detachments having been unhurt, the only damage done the guns and mounts being exposed barbettes.

To understand the requirements of carriages for heavy guns, makes necessary a study of each particular kind or class of mounts in the order given. Taking up the first class of mounts, —the casemate,—under this head we may include, also, the turret and armored casemate; proposed for use in the United States. The revolving turret system is proposed for use on sea level sites, and for guns of the heaviest calibres. They will be used where the field of fire is very extended. Of necessity the carriages are low and resemble in many respects, naval gun mounts. Owing to the great cost of turret, armor and machinery, the interior size of the turrets are restricted, and while not so much so as in the case of turrets on ships, yet the land gun being generally heav-

ier and larger, makes the amount of inside space as little. The Collingwood turret, used in England, mounts two heavy guns, which are in barbette. The carriages are hydro-pneumatic ones, rest on a steel deck or floor, which revolves as a turntable. The walls of the turret are fixed, and inclined to the horizon, and this gives greater chance for obliquity of impact of projectiles. Overhead protection is sought for, by means of a steel deck, through which is an opening for raising and lowering the guns. This leaves the gun and mount practically without any overhead protection, and the advantages of the system on a low site would be thus rendered *nil*, when taken in connection with the cost. The Gruson turret system proposed for low sites, like that of Romer Shoals in New York Harbor, has the distinct advantage of complete protection, limited only by thickness of armor. But in addition to its great cost, it is extremely doubtful if the great mass of steel and machinery can be made to revolve and work without trouble. All machinery gives more or less trouble, and it is generally at the critical moment that it fails.

The charges of powder and weight of projectiles are so tremendous in modern guns that the effect of recoil can hardly be imagined, and smooth working of machinery that is always underneath, and therefore more subject to the effects of recoil than in any other direction, cannot be absolutely calculated beforehand. The special advantage of this turret mounting, so far as the gun and carriage is concerned, is that it is traversed independently of the gun carriage, and furnishes an all around fire. When area of site is restricted by it, we can place in the smaller space the maximum offensive power.

For all casemate carriages there must be two motions, one vertical and the other horizontal. General Abbot states that in the armored casemates the field of fire is restricted to 15 degrees in the first, and to 60 degrees in the second. This is the case with the old-style carriages we use in our casemates to-day. In an armored casemate, by using a carriage similar to that used in turrets, the elevation can be increased; but in that case more or less trouble would ensue, as a result of increasing the horizontal field of fire. The various varieties of casemate carriages have many advantages, which, however, may be summed up in

the one of affording complete cover to carriage and detachment.

In the second class the open barbette mounts are included, all methods of mounting where the gun, carriage and detachment are exposed, wholly or nearly so, both to overhead and direct fire. The great merit of this class is their economy of cost, ease of working and simplicity of construction. Necessarily they cannot be used on low sites, but reach their maximum working points on higher sites, where their elevation makes it difficult for hostile shots to reach them. Breech-loading guns have increased the chances of cover afforded to gunners, in barbette mountings, since cannoneers are not needed at the muzzle, but at the rear of the gun, and, although they are more liable to being reached by curved fire there, yet they are, also, more covered by the gun itself.

But guns mounted in this way are always exposed, and therefore are targets for an enemy's fire. On low sites, there is no doubt but the powerful fire of rapid-fire guns of a fleet would smother that of the shore batteries, and thus render, for the time being, the latter useless.

The third class, the disappearing system, comprises with us the two forms of the Gun-lift carriage, and the Buffington-Crozier carriage. The balance pillar mount, the Driggs-Schroeder mount, etc., of rapid guns, partake more of the open barbette system, since in action they are loaded and fired in an exposed position. By the disappearing method,—which our Artillery Drill most directly calls a class of the barbette system,—the parapet affording protection is necessarily fixed and immovable in position. With the gun-lift, the gun and carriage and platform on which they stand, are moved upward by hydraulic power to the firing position, and sink again by the same power to the loading position, under cover of the walls. In the Buffington-Crozier class the platform remains fixed, as also the greater part of the carriage, and always under cover. When loaded and laid, the gun is elevated above the parapet and it and part of the carriage are exposed for the small instant of time necessary to fire the gun. Its recoil throws it back to the loading position under cover. The whole of the *personnel* remaining under cover at all times, and as explained herein some pages back, they are protected ever against curved fire

and practically unexposed. Against overhead fire, there is no protection beyond that afforded by the elevation of the crest. The Gun-lift has, under recent action of the Ordnance and Fortification Board, been practically condemned, so that the only system of disappearing carriages used in the United States service is the Buffington-Crozier carriage.

A mature consideration of the foregoing pages must convince us that all systems of mounts for heavy guns must come under one of the two heads, of disappearing or open barbette. In order to apply the carriage to the site best adapted to it, that is, to place the carriage best adapted to any site, an analytical discussion of the various forms of gun carriages used in these systems is necessary.

What requirements should carriages for heavy guns fulfill?

- 1st. A firm and reliable platform from which to fire the gun.
- 2d. Arrangements by which the gun can be easily loaded, traversed, elevated or depressed and fired.
- 3d. Cover or protection to gun, carriage and detachment in proper amounts compatible with efficient service of the gun.
- 4th. Carriages must be simple in construction, easy to manipulate, and strong to sustain the heavy shock of firing, and weather of all sorts; of as light weight as is consistent with strength and movability.
- 5th. They must be economical in first cost, and in maintenance.
- 6th. They must be arranged so that the same parts of carriages of the same calibre can be interchangeable, and be adjusted to all positions and sites.

Obviously the first condition is the most essential and without its fulfillment, the entire gun and mount is rendered useless, since in firing guns, if the projectile cannot be started on its path accurately, we simply wantonly waste powder and metal. Carriages mounted in barbette are made sometimes to revolve about a point, called a pintle, at the front and under the chassis. They are then called front pintle carriages and necessarily their area of fire is limited. Again, the pintle is under the centre of the chassis, and they are then called centre pintle carriages, and may then have an all around fire.

When the pintle is front, errors in the level of the traversing circle may be more easily corrected than when the pintle is in the centre. Errors in laying guns may be often counteracted by errors in carriage. But inasmuch as it is presumed that carriages are accurately made and mounted, errors in laying should not occur. Since it is the play at different points between the rails and guides pintle and carriage,—that is, those points around which rotation, and flexure of supports between points widely separated,—takes place, it can be understood that in barbette carriages which are either of the front or centre pintle pattern, there is more chance of error in the foregoing respects, than in the case of the Buffington-Crozier, which revolves on its 24 live rollers, and which can be accurately laid and absolutely level.

Lieut. C. G. Gallup in a masterly article on artillery carriages says on this point: "We have our guns, carriages, projectiles and powders, and our limit in accuracy is their limit. As soon as any new thing is suggested in connection with powder, projectiles or guns some one or some nation experiments with it to determine its value, and, if it will increase the accuracy or power of the gun, it is adopted. But it looks as if all our attention was being concentrated on these, to the neglect of the mounts; yet to-day, accuracy of fire depends more on the mount than on the guns, *i. e.*, the error of the gun is less than the error of the carriage, due to faulty design or workmanship. Why, when mounts are made for heavy guns, do they always throw them together, hap-hazard, loose in every joint and uncertain in their action? The breech-block of a gun is made a perfect fit, and what part of the gun carriage has a greater strain? Can we not have a carriage with points and connections so made that they would not look as if made either with insufficient tools or skill or both?"

When we have such a carriage our accuracy of fire will depend principally on guns, powder and projectiles, and not as at present on the carriage. All carriages for heavy guns consist of a top carriage and a bottom one, or chassis. The former is movable, the latter is fixed,—so far as recoil is concerned. Many of our mounts have a high top carriage running on a high chassis. This gives occasion to a couple about which

gun and carriage tend to revolve, and adds to the jump. The navy top carriage has very little height above the gun slide, and the latter being close to its platform, the tendency to jump is greatly decreased. The jump of a gun being an uncertain element, every effort should be made to get rid of it, and any mount which causes the gun to recoil in a direction parallel to its own axis reduces to the minimum the overturning couple.

In these days of rapid-fire guns, rapidity of fire, even with heavy guns is a desideratum. A gun in barbette can be loaded quicker than a disappearing one; but it cannot be elevated or depressed, traversed or fired in any less time. As compared with a casemate gun, it may be loaded as quick, but the latter requires a longer time to train. There is a happy medium which must be aimed at, between rapidity and deliberation of fire; for if too rapid, then accuracy suffers; but in cases of emergency it is necessary to load quickly and have the gun trained and ready to fire at just the instant we wish. Any carriage by which sliding friction is the method used, in part or whole, to check recoil, must be abandoned. The ideal carriage in this respect is the one with few joints, and in which the loading and firing, and laying can be done in any position. On account of great weight, modern gun carriages must be supplied with proper machinery for working carriage and gun with celerity. Of necessity this power should be some other than hand power. It may be steam or electricity or other suitable agent. The same power can be utilized in hoisting ammunition, loading gun, traversing and elevating it, and even running it to a firing position. To reduce recoil to the narrowest limit, without exercising strain on parts of the carriage, there must be a constant pressure maintained in the cylinders, and where friction is depended on as an assistant, this cannot be the case. The most difficult problem connected with modern ordnance is in the recoil. With barbette guns of an open mount we consider generally only the dissipation of the tremendous energy generated by recoil. But in the Buffington-Crozier gun, we go further by utilizing and storing up a part of this energy to raise the gun to the firing position.

The necessity of cover to gun and gunners is greater to-day than ever before. It is claimed that cover makes cowards of

men, when they are obliged to fight in the open. It is passing strange that human nature, being the same the world over,—this applies only to soldiers, and not to sailors ; it has never been claimed that heavy armor made a sailor less brave than wooden walls. But it is sure that the results of modern wars prove that to work guns effectively, gunners must remain with their guns, and where batteries are exposed to the tremendous smothering fire of modern warships, at short range, they must be protected to a great extent, to be of any use at all. Protection is needed in proportion to the extent of danger, and it is but of little use quoting experiences of war in this regard, since a little study of every harbor will easily determine to what extent the danger may exist, as against the sites of various batteries.

Since the manipulation of heavy weights, made necessary to sustain the tremendous shock of recoil, requires us to use to a greater or less degree, machinery and power other than that of hand, it is extremely necessary that we should seek for simplicity of construction. The material of which carriages are made must be steel in some form, in order to reduce weight to a minimum. So, also, since the number, estimated by our ordnance and engineer experts, of guns required to arm all the fortification planned, runs into the thousands, economy in both first cost and maintenance is an important desideratum. The class of men enlisted as soldiers do not possess that degree of mechanical intelligence and knowledge, as to insure the best working of the machinery of gun mounts, which in their simple form taxes the greatest minds to thoroughly comprehend. For the same reason, the same parts of gun carriages of the same size should be interchangeable, and carriages generally should be adapted to all or any site.

Let us apply the foregoing requirements to the various systems of mounts, and by a comparison of the considerations connected therewith, deduce conclusions that will enable us to decide as to the absolutely necessary essentials the proper carriage must possess.

Guns mounted in open barbette have many types of carriages, but all have a top carriage and a chassis. Owing to the fact that the chassis is always fixed, except in traverse, the top carriage being movable,—the chassis can be constructed of long,

unbraced pieces, which will carry the strain of recoil in the direction of their length. The carriage is, therefore, simpler and more compact. It can be loaded from the breech, and the stored-up energy of recoil can be used to send it—"in battery,"—into the firing position. But it cannot be loaded more quickly than either the casemate, turret or disappearing form of carriage, for the time necessary in the latter to throw the gun into the firing position, is offset by the time necessary in the former to run the gun and top carriage "in battery." The volume of fire from this mount is therefore no greater than from others. Is its fire more accurate? Surely not, since owing to the couple engendered by either front or centre pintle, and the moving of the top carriage on rails, is more likely to injure the perfect levelling and accurate laying than is the case of the disappearing gun, mounted on its 24 roller points of support. It is argued, however, that there is a loss of rapidity of fire and of accuracy with the latter carriage, owing to the play at points which cannot be eliminated entirely, and to the springing of long, unsupported pieces: that the slightest difference of level of base-ring, and consequently of the roller path, or even the slightest ellipticity of the base-ring, causes the rollers to jam or move hard and unevenly, etc.

When Stephenson built the first locomotive, the rails were of wood, and it was predicted that the uneven motion would destroy the steam carriages, and culminate in accidents. But as time went on, rails were changed from wood to iron, and these in turn gave way to steel, and to-day railroads have beds so even and smooth, rails jointed together so closely, and with all so strongly made, that loads over one hundred times as heavy run at tremendous speed without accidents, with no jar or unevenness, and with scarcely a tremor. If the engineer makes his platform properly, and the base-ring is properly made at the foundry, it can be accurately laid, and levelled. Two years ago the majority of our heavy guns were constantly giving trouble in their traversing and laying. To-day such guns are the exceptions and the majority of them, even the 12-in. gun with its great load of carriage and counterweight, amounting to over two hundred and fifty tons, can be easily started and traversed with one hand. Two hundred years ago, watches were larger

than many clocks of to-day, yet so great has the advance been in mechanical construction that to-day an accurate timepiece can be made that is no larger than a silver dime. So, also, is the machinery of a disappearing gun made better, tighter-fitting, more accurately with every carriage that is turned out. Every ordnance and artillery officer is acquainted with the fact that the present Chief of Ordnance has spent his time, for years past, perfecting the gun mounts which bear his name. When the proprietor of a factory having a valuable engine or motor in it, starts it up, he does not go out and pick up the first man on the street to run it, but he pays a good salary and hires a competent engineer. In the army Uncle Sam cannot expect that men enlisted everywhere will understand all the complicated mechanism of his various guns and carriages at once, but there is no reason for not believing that where intelligence and care are exercised, not only are guns properly mounted, but they are properly kept and properly used, and therefore due to their tremendous power and accuracy, they are most economical at the critical moments. The barbette mount does not require the care that the disappearing mount does. The latter requires the care and skill in maintenance and handling. So does the monster 120-ton locomotive that hauls the train from New York to Buffalo and Philadelphia at 70 miles per hour. Given such care, the disappearing carriages will not get out of order, and the longer they are cared for, the easier does their manipulation become, and the better acquainted with them become their care takers. And when required to respond, how magnificently do they do it? Laid and trained, and loaded, beneath cover, at will—they silently rise in the air, accurately point their huge mouths in the proper direction for an instant, and then vomiting forth their deadly contents at the enemy, at distances that appal naval men, they sink back quietly beneath their cover, leaving no trace whatever of their whereabouts. Turrets and casemates are fully as costly as the disappearing mounts, in fact, the first is more so. They are capable of being fired with as great rapidity as either the open barbette or disappearing mount. But casemates limit the field of fire to a dangerous extent while the disappearing gun has an all around fire; the former offers an ideal target to the enemy, and by repeated blows becomes vulnerable. The latter

is inconspicuous and presents nothing to fire at. Turrets, while not so conspicuous, are far more complicated in their machinery and a single shot while not injuring the gun, may jam it if it be a front pintle gun. The open barbette mount has an advantage of costing less than the disappearing, but this difference in both parapet and carriage does not amount to six per cent. less in favor of the barbette.

As against its greater cost the disappearing gun has 20 per cent. greater accuracy. Its platform is more stable, and while its parts are more numerous, they are like the parts of the steam engine, capable of greater power. The usual form of barbette mounts dissipates the energy of recoil, but the disappearing mount, takes it up, stores it, and uses it to throw the gun up to the firing position. The barbette gun mount is lighter, but as all mounts of large guns are heavy and require machinery to manipulate, this consideration bears no weight, except in the one matter of cost. The barbette mounts cannot be used on certain sites, as for instance, those on low levels,—while, as pointed out in Major Knight's article, the disappearing gun can. The disappearing gun mount can be used on all sites, although it has its maximum advantages at certain elevations of about 100 feet.

But it is the one requirement of cover or protection that the adherents of the disappearing gun must place their greatest reliance on, and insist that in that particular alone, its advantages are so superlative that without others it will outweigh the other systems. It is said that Napoleon scorned fortifications and relied on the courage of his soldiers as being the best protection. That was all right a century ago, but had the great general lived in these modern times of accurate firing of shrapnel, of steel shells filled with high explosives, he would have changed his mind. Because there has never been a really first-class combat between forts and ships in modern times, and because in the half-way combats that have been held, the forts have more than held their own, is no argument for doing away with protection to gun and detachment. We hope that there never will be such a combat, and we believe there never will be, but it will be because the forts and guns are properly constructed with cover for men and weapons. To make the gun efficient, men must be protected, and the importance of proper cover can-

not be over estimated. The protection should only be compatible with the efficient handling of the gun. The barbette mount does not afford this,—the disappearing mount does. A modern battle-ship possesses an average of eight rapid-fire guns to one heavy one. Land fortifications with us so far do not possess one and one-half rapid fire to one heavy gun. To place six rapid-fire guns ashore to every heavy gun, would give an immense superiority to the land over naval guns, since in considering the relative accuracy of the two, the former distances the latter by two and three to one. As a matter of fact, it is contrary to every principle of reasoning to presume that any naval attack can silence coast defenses if proper care has been displayed in their location, design, construction and armament. It is computed that the land gun overmatches the naval gun by two and three to one. The results of the few actual combats between naval and land guns,—at Alexandria, at Rio de Janeiro, at Wei-Hai-Wei, at San Juan, at Santiago, all prove the immense superiority of land fire to naval fire.

Major Clarke in his "Fortifications" says: "The vessels of a fleet greatly outmatched the coast defenses in number of guns, in many cases, 100 to 1, and consequently to the same extent in the number of projectiles, weight of metal per gun being practically equal. The ranges were absurdly short, compared with those at which fighting must be done in the future, varying from 50 to seldom over 600 or 700 yards." This was a century ago or more, he had reference to, and while ranges were increased to the average of about 2000 yards at Alexandria, the power and accuracy and volume of fire poured from the naval guns had increased in a much greater proportion. To-day a naval vessel coming to within 2000 yards of a fort, seeks to overwhelm the latter with its volume of fire from rapid-fire guns. To pour out such a volume of fire from 30 to 40 guns for 5 minutes only, on the front or crest of a single battery, means a complete smothering of any attempt by the latter to show either gun, mount, or detachment. When rapid-fire guns are mounted in the proportion of 4 to 6 to every heavy gun, then the shore batteries can, in turn, smother and overwhelm the fire of the ships. To prevent ships from passing up channels, submarine mines are placed where they can be advantageously used,

but even so, they must be defended by rapid-fire guns. Since, therefore, ships will come within close fighting ranges of 2000 to 3000 yards, and attempt to overwhelm by their fire that of the defenses, it is here that the heavy guns can be most advantageously used. Without cover they are helpless, but with cover to load and train, they rise at touch of the lever, are fired at a practically point-blank range, their projectiles going straight through the armor of the ship, and then sink back again invisible to all, but the detachment completely protected. On level sites like the southern entrance to New York Harbor, and in fact the majority of harbors of the Atlantic coast, the gun mounted on the disappearing carriage is essential to efficient protection. If an ordinary barbette mounted gun ashore is worth two guns afloat, then a disappearing gun is worth four, since its protection practically increases its efficiency 100 per cent. Referring to the disappearing gun, Colonel Clarke, the noted British engineer, says: "Of all methods of mounting yet proposed, the disappearing principle offers the greatest advantages. * * * The gun, laid under cover by a position-finder, will be vulnerable only for a few seconds before each round. Its exact position can only be identified during the brief period of visibility. There appears to be no satisfactory mode of attacking it."

To sum up then, we find the main objections to the disappearing gun to be, viz. :—

1st. Its cost: But as stated, this is only 6 per cent. more than the barbette mount, and less than the turret, and about the same as the casemate.

2d. Trouble in mounting and unreliability when wanted. As for this, if our artillery officers will take the same trouble from colonels down to 2d. lieutenants to study and know their weapons, as battery mechanics, they will find that the guns can be properly mounted, and wherever this is done, it can be properly cared for, and when the same degree of care and intelligence is bestowed on it as on their pocket watches, it will respond the same and never be found wanting. Officers must be ready to put on canvas overalls and go down in the gun-pits, and climb around the machinery and personally know the reason and use of every bit of mechanism. When this is the case,

there will no longer be complaints about its getting out of order, its unreliability, etc.

3d. By reason of the detachment being always under cover, it is feared by many, that a sense of dependence on cover will be engendered, which at certain times might make cowards of the artillery soldier.

Calm reflection on this argument will show what utter nonsense it is. Americans are naturally brave, to temerity, and to remain under cover when all the excitement of action is passing outside, requires a degree of personal restriction that is far braver than the physical rush and action of yelling and cheering in a *mèlée*. It is not necessary to linger on this point. We have good guns, and good mounts, and the best cover. Let us work and train our men to handle them to the best of our ability, and trust to the truth, and patriotism, honesty, and bravery of American manhood, and the Nation may rest assured that the attack of the combined navies of the world will not break through the cordon of our coast fortifications, armed with our disappearing guns. For our uses the disappearing guns are essential, even on the high bluffs of the Pacific. But on the low sandy wastes of the Gulf and South Atlantic States, they are absolutely indispensable for efficient protection, while in the wide-mouthed channels of Long Island Sound, Chesapeake Bay, and Puget Sound, where the waters are too deep and wide to place any dependence on submarine mines, and navies may congregate in force against any battery, it is only the Buffington-Crozier system that will give us victory. In conclusion, we may remark that though little use of disappearing systems have been made in Europe in the past, to-day Great Britain, Sweden, Norway, Spain, Italy, Russia and Holland are making use of them, and arming their coast defenses with guns on disappearing carriages.

A gun behind a parapet that cannot be penetrated, mounted on a reliable and firm platform, with mechanism that will insure its perfect running in and out of battery, when fired with heavy charges and when used for drill and practise—that is at all times invisible, except for the brief time that it vomits its deadly, blinding, crashing load directly at the enemy—that is the best kind of a defense possible to have. In our system of

disappearing carriages, properly handled, we have all the essentials called for. That the gun carriage can be made to respond at any time, or all times, to what may be demanded of it, in peace, and the rough action of target practice, with heavy charges, has been proved by more than one artillery officer. Like a steam engine, constant and daily use makes the machinery more efficient until its usefulness is impaired by time alone.

PEON OR SOLDIER.

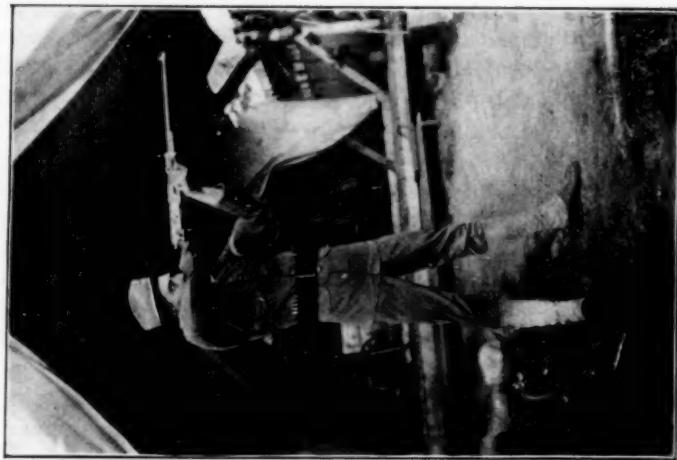
BY MAJOR EBEN SWIFT, PUERTO RICO PROVISIONAL REGIMENT.

ONE of our first experiments in the use of Colonial troops has been conducted in Puerto Rico. Beginning with a battalion of infantry, in the spring of 1899, it was increased by a mounted battalion a year later. The command was mustered out with the volunteer army on June 30th of the present year, and was replaced by the Provisional (perhaps intended for Provincial) regiment under the law of February 2d.

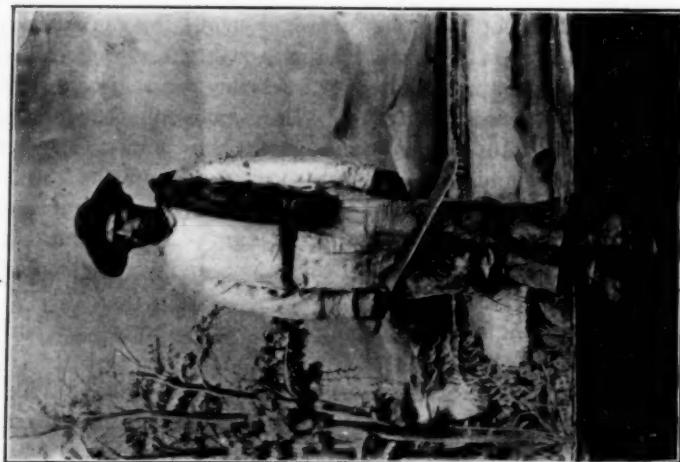
In this letter I will speak only of the mounted battalion, which completed about fifteen months of service, as my experience has been nearly all with that command, and I presume its record is typical of all other troops of the same race and character.

It had been my luck to serve with men of many different types, having been a member of an Irish volunteer regiment, had a brief tour with an Indian company, had a fair opportunity to judge of negroes, Germans, English and others as soldiers, and had the rather unique experience of serving in a regiment composed exclusively of Americans. While confessing that most of my affection naturally went toward the last named, notwithstanding his many faults, it must be said that in the Puerto Rican we will find many agreeable surprises which cannot fail to awaken enthusiasm in the military man. All men may become good soldiers under proper conditions, and worthless under the opposite.

First of all in a cavalry command is the matter of horsemanship. All are good riders, with a graceful and secure seat. Although not athletic by custom or by nature, they have ridden from childhood, and acquired that balance which can never be learned by the well grown man or boy. It is a good deal to a cavalryman to feel that he has not a man behind him holding on with his heels and dropping his chin over the pommel. The horses are native stallions of fourteen hands. They are hand-



CAVALRYMAN P. R. P. REGT.



NATIVE PUERTO RICAN.

some, tractable and well gaited. They fight and kick a good deal, and they are not so strong and hardy, even in their own country, as the American horse.

Careful instruction of these men in their own language is easily imparted in the following manner. There is a daily school for non-commissioned officers at which the elementary parts of the drill book are translated and dictated in Spanish. The non-commissioned officers write down the dictation, study and recite it, and then drill their squads, giving English commands and the Spanish explanation. Under this system considerable precision of drill is attained. In a few months the men march on foot with the long, quick, swinging, thirty-inch step in a way that makes them look like veterans. It takes time, but the whole year is a season for drill.

The entire number of trials during the fifteen months of service, was about twelve hundred, but of these it may be said that one-half were furnished by twenty per cent. of the command. This shows that a much better lot of men could have been gotten if it had been possible to pursue a better process in the selection of recruits. There was a single absence without leave of short duration. There was not one deserter. There were about twenty-five cases of drunkenness, also furnished by a few bad characters. There was no case of alcoholism, and an insignificant number of small fights. Most of the trials were for absence from roll-calls and small neglects. The average strength was four hundred and twenty-five.

In target practice with the carbine an average company made 34.93 at all firings. Comparing this with the results in the Regular army for 1897, when the last general practice was held, we see that the company would have stood 246 out of 300 organizations firing. The record would have been much better if it had not been necessary to fire the volleys in long grass. In the revolver practice the same company (still not the best) made an average per cent. of 59.75 in all the courses of pistol firing, which would have ranked 44 out of 100 organizations firing in 1897.

The police and care of the camp soon reached a high standard, without any other incentive than frequent inspections. It seemed that habits of order, neatness and cleanliness were re-

placing the opposite qualities. To change the habits of a life-time with men who had mostly walked without shoes, slept without sheets and eaten with their fingers, would seem to be a hopeless task if we did not remember the gentle and tractable nature of the people. For instance, at the beginning there was quite a prejudice against bathing on the part of some, and rather amusing arguments were advanced against it. One said that it would make him sick, another that it would kill him, and that his life would be on a certain officer's conscience; another wept when forced into the water. When the first company was marched to the river, it was found that some hid themselves in the grass to avoid bathing. All this soon disappeared, the bath house became a popular place, and no special regulations were found to be necessary to enforce cleanliness. At guard-mount the "orderly buckers" soon showed themselves in large numbers.

A couple of months experience with the army ration produced a great result. The change from rice and bananas to meat and potatoes, added 20 per cent. to their weight, put color in their cheeks, and did nearly as much as drill to give the men a good and soldierly appearance.

Soldiers who do not desert or get drunk and who do not know how to "so'jer it," I had not hoped to find elsewhere than upon the blessed streets of a heavenly camping ground, but it did not take long to find a few other defects quite as trying to the soul.

Dishonesty, untruthfulness and venery, unfailing faults of a subject race, must be treated as special diseases. In the United States Regular army, thieving practically does not exist, not so much because honesty is an American characteristic as because of the tradition and sentiment of the army itself. We have there the unwritten law that every man shall join in hunting down a thief. To accomplish this among Puerto Rican troops more time is needed. Meanwhile take away as much temptation as possible by marking every article of equipment and clothing, join the fear of punishment with the hope of reward, appeal to the honor and *esprit de corps* of the best men and give the law to the worst. In this way it is possible to lead the way to a healthy sentiment in this matter.

As to lying it may not be claimed that an ideal moral tone exists in the United States army, but we can usually find in every command a sufficient number of straightforward men to serve the ends of discipline. Among Puerto Ricans I have found that the callousness of the native, in regard to telling a lie, distinctly interferes with discipline. It will take more time to pick out and develop a sufficient number of men with a high sense of duty in this respect.

A curse of all troops in the tropics is venereal disease. We have never taken proper measures to regulate or prevent it and consequently our experience is limited to the small number of Regulars who present themselves for treatment. In the Puerto Rico regiment a private examination of every man once a month has shown as high as twenty per cent. with trouble of this kind. The most successful way of reducing it is to have these men marched to the hospital at a stated hour every day for treatment. They should be deprived of the privilege of leaving certain narrow limits until pronounced cured by the surgeon. In this way the evil has been reduced thirty to fifty per cent. The Spanish means of dealing with the question would perhaps be too practical to admit of discussion in your journal.

The questions most frequently asked are:—Will they be loyal? Will they fight? The answer is in the invariable experience of all soldiers. Put a man under discipline, treat him justly, clothe him in uniform and he loses to a certain extent his former ties and becomes steadfastly loyal to the flag under which he serves. We have had sufficient experience with Indian Scouts, who by the way, had little discipline, to make it unnecessary to answer the question of loyalty. The matter of fighting, I think, depends on the quality of the officers. No well drilled command under good officers has ever failed to fight, whatever the race or color. The tendency of these men to revenge an insult or an injury to a comrade has to be watched as carefully as with American troops. Give them the confidence born of skill and discipline, with officers whom they know and respect, and the fighting qualities will not be lacking.

In addition to the civic virtues which are impressed and developed by a military life there are other things which will make these men better citizens of the United States and useful

aids in spreading American ideas. A great deal of English is learned. In addition to the commands which are in English, it is found that a great many learn to talk the language. Every few weeks the officers find new men making attempts to speak English. This can be greatly developed as soon as a post school can be started in which English can be taught. A post library and a post school can also improve the general standard of education by teaching the men who cannot read and write, a thing not reached I believe by the public school system. I expect to have men qualified as teachers of English in Public Schools through attendance at the post schools.

The work of these men in the army, their training in the use of arms, their discipline and the infallible rule of selection by which the best men come to the front, make them invaluable as members of the local police force. The Spanish rule was not to employ natives for police work, probably because they mistrusted the loyalty of the people. The result was that, on the occupation of the country by Americans, no men of experience in that line of work could be found.

The value of soldiers as citizens is so great that I would recommend that the term of service be reduced to one year for all except non-commissioned officers and special men such as cooks, trumpeters, farriers and blacksmiths. In this climate drill and instruction can go along throughout the entire year. After twelve months of drill you have gone through your entire course of instruction with thoroughness. The problem now becomes an easy one, unless you propose to tackle an advanced course in the Art of War, and it is better here to turn attention to a new lot of men. I would discharge 50 per cent. at a time under the above rule. In this way some hundreds or thousands of Americanized natives are sent forth every year to carry the message of American liberty into their homes, skilled in the use of arms and ready to rally to the colors again in case of need.

A wonderful result in bringing our new possessions closer to us would be reached by sending the native troops on tours of foreign service; if active service so much the better. Let the people once feel that their soldiers are fighting in our armies and their loyalty is increased a thousand fold. A Grand Army Post composed of native Cubans, Filipinos or Puerto Ricans

would do more for the loyalty of the people than good laws and beneficent government.

What is said of Puerto Rican troops would not apply to colonial troops used as scouts.

Troops of this class would be confined to savage or half civilized races. They will certainly always be of inestimable value in a country with which they are familiar. It has been observed that the effectiveness of such scouts becomes greatly diminished when you take them away from their own country. Then they become inferior to intelligent white soldiers; a Cheyenne would be of little use against an Apache; a Carlisle student usually lost his value as a scout; a Macabebé would probably make a poor scout in Virginia. The Cossack is worthless as a Regular. For such troops it is necessary to preserve the national characteristics and language. If they wear rings in their noses let them so continue; if they plait the hair like a Cheyenne or roach it like an Osage, let them continue to do so, as soldiers. Our experiment with Indian soldiers was abandoned as soon as we took them away from their women and children, cut their hair and tried to bring them up to the standard of Regular troops. Officers should communicate with them in their own language; precision of drill should not be required; their superstitions and pride should be carefully nourished, but cruelty repressed. A different standard of punishment should be made. Distinguishing marks of clothing and adornment should be given them. The salute with the hand should not be required and a verbal salutation substituted.

Such a man looks upon an American officer with all the veneration due to his hereditary chief. He will consider it an honor to work for him, will give perfect and unquestioned obedience. On the other hand, the officer must not step off his pedestal; he must be temperate, show no fear and must be skillful in the use of weapons.

WHO BURNED ILOILO, PANAY, AND WHY WERE CONDITIONS IN NEGROS MORE FAVORABLE TO US?

By MAJOR C. J. CRANE, U. S. A., ASSISTANT ADJUTANT GENERAL.

THREE seems to have been in the minds of many of our people the idea that the Visaya did not at first share the Tagalos animosity toward us, nor the desire for independence which actuated the inhabitants of Luzon.

They were surely mistaken. Before General Miller arrived in the harbor of Iloilo, Panay, the inhabitants of that island re-organized their Junta which had been working against the Spaniards. I have seen no record of what was the designation of the first organization of self-government, but the arrival of the Americans found them working under the title of *Consejo de Estado Federal de Visayas*, and the other islands of the Visayas were represented therein, but by residents of Panay.

They communicated with Luzon, looked upon themselves as part of one government, following the lead of the Tagalo, and even asked that troops from Luzon be sent to Panay. These troops arrived in time to fight the Americans from the very start of the campaign beginning at Iloilo.

The foregoing statements are made after having read the original insurgent records of proceedings of meetings of their *Consejo de Estado Federal de Visayas*, meetings held in Jaro, Iloilo, Santa Bárbara and finally at Cabatuan where, in September, 1899, the *Consejo* went out of office by command of General Martin Delgado who was insurgent commander-in-chief on Panay.

The object of this article, however, is to furnish translations of three (3) meetings of the *Consejo de Estado Federal de Visayas*, which contain much interesting information concerning several important questions.

Already Boards of Claims have been at work on demands for reimbursement by the United States for losses caused by the burning of Iloilo, February 11, 1899, and many more such

claims await the result. And for a long time many of us here in the Philippines have wondered why Negros Island was so quickly subdued and pacified, and governed more than other islands by civil authorities.

The following translations throw a great deal of light on these questions.

We see that the *Consejo de Estado* at their only meeting in Iloilo on the night of February 10, 1899, determined on resistance with great unanimity; Jovito Yusay, the man who proposed it, acted as President of said *Consejo* most of the time until the *Consejo* expired in September, 1899, and he was warmly seconded by Victorino Mapa, a little lawyer who stood by the *Consejo* during most of its existence. Yusay and Mapa now hold important offices under the United States Government. At a meeting of the *Consejo* held March 15, 1899, in Cabatuan, it was resolved to send out a written protest, addressed to the different Consuls at Iloilo, on the subject of the burning of Iloilo. A casual reading of the proceedings of that meeting will show that the Visayans of Panay then not only acknowledged responsibility for the actual setting fire to Iloilo, February 11th, but that they laid claim to great self-denial in so doing, not wishing the Americans to have possession of Iloilo, then a flourishing city, and preferring to see the place destroyed by fire, their own handiwork.

The fire was carefully prepared, oil being placed in many houses to make sure work. It is said that our ships opened fire at daybreak on some natives working in the trenches, these trenches being undoubtedly part of the resistance resolved upon.

Translation No. 3 shows that the resources of Negros were necessary to sustain life and the insurrection in Panay, and that the heads of the insurrection in the Visayas, living in Panay and owning a great many rich haciendas in Negros, believed that better results would obtain if the insurgents of Negros were kept from active participation in the field operations, but if instead of that, they were to supply the Panay soldiers with supplies of all kinds. Incidentally these councillors naturally preferred not to see their own haciendas in Negros fought over. There certainly were organized bands in Negros and they gave

our troops there lots to do, but not all that Negros would have done.

The Sixth Infantry has done fine service in Negros, and in one of their fights one of the finest officers in all the service, Hayden Y. Grubbs, died as became his character, every inch a soldier and one of nature's noblemen.

But there is no mistaking the importance of the action taken by the Consejo ; there was no such insurrection in Negros as existed in the other large islands and it is now evident that the Consejo so decreed it. While serving in Panay I heard more than once that "Molo did not wish any insurrection in Negros," the reason given being that the "principales" of Molo owned many rich haciendas in Negros and that in Molo lived the brains of the insurrection. I believe it all now, and when the next insurrection begins in Panay the leaders will still be found in Molo, and some of their names can now be seen in the following records, showing what they have done in the past.

The wealth and brains of the Visayas are to a great extent centred in Iloilo, Jaro and Molo, so close together as practically to form one city.

The original papers of these translations were captured in Panay, some months ago, when General Hughes was directing the active campaign which stamped out open resistance on the island and caused to begin among the insurgents the race to surrender themselves, which rapidly spread throughout the Archipelago. What particular body of troops made the capture is not known.

ILO ILO, Panay, Aug. 12, 1901.

[TRANSLATION NO. 1.]

PRESIDENT.

Sr. Raymundo Melliza.

COUNCILLORS.

Sr. Jovito Yusay ;
Sr. Julio Hernandez ;
Sr. Fernando Salas ;
Sr. Juan de Leon ;
Sr. Benito Lopez ;

VOTERS EX-OFFICIO.

Sr. Pablo Araneta ;
Sr. Martin Delgado ;
Sr. Pascual Magbana ;
Sr. Ananias Dioceno ;
Sr. Victorino Mapa.

PROCEEDINGS. In the city of Iloilo, February 10th, 1899, 8:30 P. M., there being assembled the Councillors and Generals, Voters ex-Officio, whose names appear on the margin, after having been summoned in proper form, the President declared the session open.

Proceeding to business the Commissary of War read the letter from General Miller to the General in Chief of the National forces in which he announced having received from General Otis an order to take possession of the City of Iloilo and its adjacent territory as soon as possible ; and that in view of this order he fixes upon

SECRETARY.

Sr. Francisco Soriano.

sunset of Saturday, the 11th instant, for the surrender of Iloilo, Jaro and Molo.

In the face of this threat, the ultimatum of the American General, the Commissioner for Government, Señor Jovito Yusay, in vigorous terms spoke in favor of the resistance which should be offered to this American invasion; this counsel finding support in the Auditor General for War, Señor Victorino Mapa, who was full of similar ideas, as also the entire Council.

It was resolved in motion of Señor Hernandez that Iloilo, Jaro and Molo should have military government, and that from that same night the inhabitants of those towns should be notified of the reply to the communication of the American general.

It was also resolved, on motion of Señor Mapa, that the Military Administration should be attended to with greater care than had been seen until then.

Likewise it was resolved that from that very night the Government collect whatever supply of rice there might be in the town of Iloilo and have carted immediately, all the rice obtained, to the town of Santa Bárbara, that place having been selected as the seat of Government.

And having no other business to transact the session was adjourned, and is recorded in these proceedings, which is signed by the gentlemen taking part; to which fact I, the Secretary, certify.

The President.

Fernando Salas.

Benito Lopez.

The Secretary,
Francisco Soriano.

[TRANSLATION NO. 2.]

PRESIDENT.

Sr. Jovito Yusay.

COUNCILLORS.

Sr. Julio Hernandez.

Sr. Magdaleno Javellana.

Sr. Fernando Salas.

Sr. Ramon Avanceña.

Sr. Benito Lopez.

VOTERS, EX-OFFICIO.

Sr. Victorino Mapa.

Sr. Tranquilino Gonzalez.

SECRETARY.

Sr. Francisco Soriano.

PROCEEDINGS. The Councillors and Voters ex-Officio whose names appear on the margin having assembled in the convent at Cabatuan, March 15th, 1899, as previously notified, the President *pro tem.*, Señor Jovito Yusay, announced the session open.

Proceeding to business the minutes of the previous meeting were read and approved entirely, and certain propositions by some of the councillors having been submitted for deliberation, the following was resolved upon.

1st.—In view of the letter from the President, Señor Melliza, to the under-

signed, to the effect that he has made no division of the Secretary's office as appears in the proceedings of February 9th, 1899, held in the city of Jaro, and that on the contrary the said President thinks that the office of the Secretary of this Council of State must not be divided, and that what he had intended to do if the Americans had not appeared to interrupt the regular march of affairs, as well of the Government as of the island, was to divide the labors of the Secretary's office within the office itself.

And since really the division of the Secretary's office originates difficulties arising from rivalry between offices, and because said division is unnecessary, the resolution of the Council contained in the proceedings mentioned concerning the division of the Secretaryship into two (2)

offices is revoked, the office remaining one (1) as it was before this innovation, according to resolution embodied in the minutes of proceedings held at Headquarters in Santa Barbara, November 17th, 1898, retaining therefore the previous designations of Secretary General and Vice Secretary, and to the tenth (10th) resolution of the proceedings held in Jaro, November 21st, 1898, describing the cases when the Vice Secretary should officiate.

2d.—The acceptance of the resignation as Delegate from Dingle, Dueñas, Passi and San Enrique, presented by Señor Nicolas Roses, on account of the incompatibility with the military office which he performs, apart from which he is at the same time Delegate of Police in Dingle.

3d.—Approval of payment of indebtedness of the local Presidente of Iloilo to certain individuals of the local guard for services rendered which could not be paid for on account of the surprise caused all of us by the bombardment of February 11th.

4th.—As result of Señor Pedro Garganera being elected Delegate of two (2) groups and being opposed to this the wish of the Government that each group should be represented by a single Delegate. One of the two (2) seats to which Señor Garganera was elected was declared vacant, and it was directed that he should be notified of this decision.

5th.—For official knowledge of nations and at the proper time to exact responsibility from the proper people for the destruction caused by the fire of February 11th, as well to natives as to strangers in Iloilo, it was resolved, that a written protest be prepared which should be addressed to the Consuls, to the effect that the Americans in the bombardment of the 11th had broken their agreement as to the end of the period fixed in the note of ultimatum sent by General Miller to the General-in-chief of the national forces of the Visayas, opening fire at early dawn when sunset of the 11th was allowed for that to take place. And in which protest it should be made evident that the burning of Iloilo was a sublime example of self-sacrifice and self-denial on the part of her sons who, not being able to prevent the landing of the enemy because from their powerful vessels, they were sending destructive projectiles in showers, and because of the danger and certainty of sadly dying if they persisted in not abandoning the town, did abandon it, but left the town the food of flames, in order not to see it flourishing in the power of the enemy, but full of ruins and débris.

And not having any other business to transact, the session was adjourned and the proceedings here recorded and signed by the Señores taking part in the meeting, to which I, the Secretary, certify.

The President,

Jovito Yusay.

J. Hernandez.

Ramon Avanceña.

Benito Lopez.

Fernando Salas.

F. Gonzalez.

(Another Signature)

The Secretary General,

Francisco Soriano.

[TRANSLATION NO. 3.]

PRESIDENTE (pro tem.).

Señor Jovito Yusay;
COUNCILLORS.

Sr. Ramon Avancena;
Sr. Fernando Salas;
Sr. Julio Hernandez;
Sr. Benito Lopez;

PROCEEDINGS. At the Presidente's house at Cabatuan, June 2d, 1899, being assembled in extraordinary session the Councillors whose names appear on the margin, they having previously been summoned in proper form, on ac-

COUNCILLORS EX-OFFICIO.

Sr. Victorino Mapa ;
 Sr. Tranquilino Gonzalez.

SECRETARY GENERAL.

Sr. Francisco Soriano.

and here to abide by whatever this Government may agree upon in this particular, the Presidente announced the session opened at half past five in the afternoon.

Proceeding to business, I, the Secretary, read the minutes of the previous meeting which were approved without amendment by the Council which proceeded immediately to take up the subject of the session, and agreed upon the following :

Keeping in mind that Iloilo does not produce what it consumes, and in the present war with the United States, receives valuable assistance from kinsmen on the said Island of Negros, which would suffer equally from the blockade which afflicts Iloilo if war should be declared in the island, and especially because the Revolutionary movement which might be initiated there would not give proper results, whether on account of the actual circumstances which hinder, or because of the geographical location of the island ; the Council resolved that the island should continue in its present condition, and that a communication should be directed to Señor Dionisio Papa, Chief of the Revolutionary nucleus, to have him put himself in accord with the wishes of Señor Zoilo Mauricio on matters political, and another communication to Señor Luis Ginete, Chief of another Revolutionary body, with orders to withdraw his forces from Negros and incorporate them with the Headquarters at Santa Barbára.

As result of the blockade endured by the towns which raise our tricolor flag they suffer from a want that demands efficient and immediate remedy, for which reason the council resolved to send instructions to Señor Felix Montinola, resident of Saravia (western Negros) to send us great quantities of rice on government account.

The real business of the session being finished the Council passed on to the consideration of other subjects which might be proposed by the Councillors, RESOLVING :

1st. To approve the organization of a society which should be called "The Red Cross" for the purpose of collecting supplies destined for use of the hospitals, proposed by the Inspector of Military Sanitation.

2d. And last, to deny the request of Señor Benedicto Soldevilla who begs to be interred, when dead, in the Church at Lucena, this being prohibited by the Spanish Laws on the subject, adopted provisionally by our own legislation.

And having no other business before it the session was adjourned and is recorded in these proceedings which is signed by the Councillors taking part, to which fact I, the Secretary, certify.

President pro tem.

Fernando Salas.

Jovito Yusay

Benito Lopez.

Ramon Avancina ;

Francisco Soriano,

T. Gonzales ;

General Secretary.

J. Hernandez ;

Record of Service of Señor Manuel Roces, Captain of Infantry of the Battalion Aguinaldo.*

* This translation shows exactly where the immediate and actual burning of Iloilo is to be charged. Pablo Araneta has been a prominent Partido Federal man and was very active in bringing in the champions of misrule and persuading them to be quiescent under American rule

On the —— day of the month of ——— Señor Manuel Roces presented himself at the headquarters of Colonel Teinio in Pagsanjan and that chief gave him employment as second lieutenant of sharpshooters, and at the same time the direction of Ordnance workshops attached to the said headquarters, for Señor Roces is a machinist trained by the Cavité Arsenal.

In Pagsanjan Señor Roces commanded his section in the trenches until the surrender of Santa Cruz de la Laguna by the Spanish forces, at the same time doing duty in the Ordnance workshops (Mestranza), when not otherwise engaged.

By this time Señor Roces held the rank of first lieutenant because of his services and on account of the surrender of Santa Cruz de la Laguna.

The post of Santa Cruz having capitulated, Señor Roces made known his desire to form part of the Expedition to Panay which was commanded by Señor Pablo Araneta, and Colonel Teinio had to grant him permission.

Then he (Roces) set out for Manila the —— day of August with aforesaid permission and in this capital Señor Roces, saw with the Visayan Commissioners, Señores Francisco Soriano and Carlos Ladesma, who confirmed what he had heard of the proposed expedition to Panay, and, in fact, on the —— day of ——— there arrived Señores Pablo Araneta, Monico Puentevella and Francisco Villanueva, the chiefs who had charge of said expedition.

On the day following the arrival of these gentlemen, Señor Roces presented himself to Señor Pablo Araneta to express his wish to take part in the expedition, which was instantly granted.

Señores Araneta, Puentevella and Villanueva left Manila with some fifty soldiers of the Guardia Civil who had been disarmed and expelled by General Ríos, and with them Señor Roces, for Batangas for the purpose of collecting two hundred and fifteen rifles, and to there embark for Panay.

When these expeditionary troops arrived at Batangas, there was in the bay no steamer of the Filipino Government and they had to wait two weeks for the opportunity to leave that port.

From Batangas, the expedition sailed the —— day of ——— for Panay on the steamer *Isabel*, and on arriving opposite Calapan, Mindoro Island, the machinery received a damage to repair which Señor Roces offered his services, having it regulated and ready the following day. From Calapan the expedition departed for Bululacao and in view of the very bad condition of the machinery, and because of the hard winds then blowing, Señor Roces, who had been lending his services as machinist, made known to the chief of the expedition, Señor Araneta, the rashness and inconvenience of continuing the journey aboard the steamer *Isabel*.

Very near the spot where the *Isabel* was anchored, was a schooner belonging to a Cavité man: it was proposed to the captain of the same to continue the voyage to Panay, receiving pay for it, which he gladly accepted, and the expedition was transferred to the schooner which left Bululacao the next day.

From Bululacao to Alipato the journey was made by the schooner in one day, and from that little bay of the Antique Coast the expedition marched overland to Colosi. At Colosi about one hundred men pre-

till a more favorable opportunity arises. He is no more to be trusted now than when he had Iloilo burned, and one good look at him will satisfy most men that this is so. We will hear more of him some day.

sented themselves to Señor Araneta to take part in his expedition, and the following day the expedition marched for Arevalo under command of Señores Montilla and Roces.

Once in Arevalo, Señor Roces asked leave to go to Dumangas for five days and he returned to Molo, where he met the forces of Señor Araneta on the 20th, afterwards entering Iloilo when General Rios surrendered the capital of the Visayas, as Field Adjutant of General Pablo Araneta.

Señor Roces continued to act as field adjutant until the memorable bombardment of February 11, 1899, when General Araneta commanded him to order the officer of Lieutenant Colonel Salvio to distribute among the houses the petroleum which was deposited in the town hall of Iloilo. While in the execution of this mandate of his General, Sergeant Balmoria, of the local guard, came to Señor Roces with the important information that in the town hall was left the treasury box with twenty-five thousand pesos and that there was no one in this public building, neither the Presidente nor the Collector of Revenues, Señor Yulo. Then Señor Roces directed and arranged that the said box should be carried to the building of the Federal Government, and this was done.

From Iloilo, Señor Roces went to Molo to join the General and report to him result of the commission entrusted to him, having to keep up the fire against the enemy until seven o'clock at night. That same night, of the 11th, General Araneta received orders from the General-in-chief, through Lieutenant Colonel Villanueva, that his forces should be concentrated in Santa Barbara.

The day following, the troops of General Araneta set out for Santa Barbara, having passed the night in Arevalo.

The Account of Services of Manuel continues, covering a period of a couple of months more, and is not signed.

DRUNKENNESS IN THE ARMY.

BY CHAPLAIN HENRY SWIFT, U. S. A.

DRUNKENNESS in the army has without doubt materially increased since the Canteen was done away with.

The restrictions of the Canteen, prevented or rather forbade the sale of distilled liquors or heavy wines within the garrison. It reduced the price of beer sufficiently to make itself a strong competitor against saloons contiguous to the reservation. Furthermore, stringent measures were generally taken to prevent or discourage men from resorting to outside saloons. Within the Canteen it was possible to maintain discipline, and prevent excesses. In this way, the men who were accustomed to drinking a moderate amount of beer, could get what they wanted, openly, and respectably, and reasonably. The men who drank ardent spirits and confirmed inebriates were bound to leave the reservation, and resort to the saloons. No military regulations could meet their cases. The only drastic remedy was the guard-house, and in due time, almost inevitably, a dishonorable discharge.

There is a great deal said about drunkenness in the army. There is a covert suggestion that the army has a demoralizing tendency, that the unledged and innocent are led away therein, and fall as they never would have fallen, had they not enlisted. I maintain that, on the contrary, the army's influence is in the direction of good rather than evil. Wherever men congregate and live together, cut away from the social and restraining influences of home, there will be found a greater temptation to intemperance, gambling, impure living, and that departure from religious standards of thought, word and action, which is called Godlessness. It is seen in the mining and lumber camp, among cow-boys and bull-whackers (excuse a slang term, for which no more expressive synonym exists) and teamsters, on ship-board, on the canal, and in numberless other situations. The occupations in themselves are all right and honorable. The increase of lawlessness comes from the peculiar environment, and

the unrebuked, unrestrained influences of the worser elements.

In the army a stern discipline is exercised to punish and suppress these evils as far as possible, while a care and thoughtfulness is ever in evidence, to encourage excellence, and contribute to the moral sustaining or uplifting of the men. Promotion and positions of responsibility reward the worthy. Careful attention is given to the sustenance, comfort and health of the men. A good soldier, is a man who deserves and obtains the respect of his officers. On the other hand offenses, which outside of the army, would be condoned or ignored, are within it severely chastised. The irreclaimable drunkard, after a sufficient number of trials, is dismissed the service, as being unworthy to remain in the ranks. Disrespectful language and oaths are forbidden to superiors. And the regulations forbid the use of violent and profane language from superiors to inferiors. It is no fault of the regulations if their word and intent are sometimes transgressed. Gambling is forbidden in quarters, and anyone in charge of public funds, however small the amount may be, can be dismissed the service if he gamble. Those making false official statements are severely chastised. For foul living a man is liable at any time to discharge without honor. Dishonesty in any transaction is punished as a rule more severely in than out of the army.

While the Canteen was in existence, much could be and was done in the posts to humanize and promote the welfare of the men. The profits arising from the sale of beer made it possible to keep up a store, where a considerable trade in staples, delicacies, necessary articles of toilet or clothing, etc., could be kept up at little above wholesale rates. There was a credit system, absolutely safe, by which the men, between pay-days could buy on the most advantageous terms.

It was possible to keep up a post reading-room, amusement room, gymnasium, to aid in getting up private theatricals, etc. Seed could be purchased for post gardens, the post library be replenished, and best of all a very considerable addition made in quality and variety to the men's tables.

Now all is changed. Out here in the Philippines we feel it more than in the States. Credit now is only possible with the numberless saloons which have sprung up around our scat-

tered stations, and in Native and Chinese dives. The sale of whiskey and brandy and the like is unrestricted, while the price of beer is so high that men buy the stronger intoxicant preferably. Worse than these, the Native vino and opium smoking have made of many hopeless mental, moral and physical wrecks. The Canteen stopped credit at one-fifth of a man's pay ; the outside dives draw the line at a man's all. The company funds, with a barren credit, and ever growing debit account, are rapidly dwindling towards the vanishing point. The tables of the men show a resulting deterioration ; and men when their food is inferior, are more apt to resort to drink, or rather resort the more easily to drink.

Our court records give a melancholy showing. Were it not for vino and whiskey, the majority of indictments would never have been drawn up. Lives that otherwise had good promise in them would not now be blighted by the demoralizing influences of prison, and the degradation of a dishonorable discharge.

I have always been in favor of the Canteen. I have observed for the past thirty years the working of the drink problem in the army, in the old post-trader days, and the Canteen from its inception to its fall ; and the Canteen alone came nearest to a satisfactory solution.

There were faults in the system and management of the exchange, for which the broadened experience of army men could suggest corrections and improvements. I wish it were possible to have a dispassionate discussion of the question ; and better still, after it had been open for some time, a report made by chosen men in the service ; suggesting some institution in our various posts on the lines of the old exchange.

The experiment has been tried, a kind of heroic surgery, of simply cutting away the Canteen.

Over the text of that bill should be written the words, "Mene, Mene, Tekel, Upharsin." It is the old story of the house swept and garnished, to elucidate which allusions I refer you to Daniel 5, 25 ; Luke 11, 25, 26.

ARMY REGULATIONS.

BY CAPTAIN JOHN BIGELOW, JR., 10TH CAVALRY.

WHILE an officer has a right to the loyal obedience of a subordinate, the subordinate has a right to expect, not to say demand, of a superior that his orders be at least intelligible ; and an officer owes it to himself as well as to his subordinates to make his orders not only intelligible but so clear that their meaning cannot be mistaken. It is enough to expect of a soldier that he will carry out his orders once he understands them. It is too much to expect that he will rack his brain to get at the meaning of his orders,—to that extent doing the thinking that should have been done by his superior.

Our Cavalry Drill Regulations and Guard Manual abound in ambiguities and inconsistencies, which like the beauties of Shakespeare, increase and multiply with one's reading and reflection.

Our Army Regulations are said to have the force of law. In one sense they have. But in another sense they have not, —for the reason that they have not the clearness and consistency of law.

Paragraph 1031 seems to allow a private under charges to remove his case from a summary to a garrison court-martial, and paragraph 1033 to prohibit a corporal from doing so. Sub-paragraph 20 of Par. 975 refers to "company bearers." This term has no meaning under present conditions as there are no men in a company specially designated as litter bearers or "bearers." This sub-paragraph seems to contemplate that the men in a company be instructed in ambulance drill. Paragraph 1608 defines the instruction to be given them as litter bearing and rendering first aid to the injured.

The principal fault to be found with the Army Regulations is that they are not sufficiently comprehensive and explicit. Many of the provisions scattered through the Medical Manual, Subsistence Manual, Quartermaster's Manual, Ordnance-property Regulations, and other compendia of Special Regulations ;

also published on Muster Rolls, Ration Returns, and other blank forms, and in Orders, Circulars, etc., should be embodied in the Army Regulations. This remark applies specially to times of volunteer expansion of the army. A few of the provisions referred to are the following:

Par. 118, *Manual for the Medical Department*, requiring the Senior Surgeon of each hospital, post, regiment, or detachment, to make a daily report of sick and wounded to the commanding officer.

Par. 180, *Manual for Quartermasters serving in the field*, fixing the allowance of bran for public animals.

Par. 61, *Manual for the Subsistence Department*, defining the unit of issue, also par. 93, referring to ice.

Paragraph 114, *Ordnance Property Regulations*: "When a requisition is made for an advance of stores to be held as a reserve, the officers requiring and approving must state the necessity therefor."

Par. 47, *Manual for Quartermaster's Department, 1896*: "Requisitions for colors and guidons should state whether new staffs are to be furnished."

The following provision of the act of Congress, approved March 16, 1896: "Each prisoner upon his release from confinement, under a court-martial sentence involving dishonorable discharge, is entitled to a suit of citizen's outer clothing at a cost of not to exceed \$10.00."

Circular No. 6, S. 1886, Headquarters of the Army, relative to the issue of extra stationery.

Embodying in the Regulations, proper, any instructions printed on blank forms should not entail the omission of such instructions from the forms themselves. On the contrary, the instructions and regulations printed on the forms might advantageously be elaborated.

The various codes of regulations, however good they may be separately, may be collectively defective from want of unity. In this connection the Articles of War may be considered as regulations. To mention but a few instances of the sort of conflict referred to. The 11th Article of War makes the granting of furloughs in the case of a field officer commanding a post wholly discretionary. Army Regulation 116 restricts the duration of the furlough to 20 days and the number of recipients to 5 per cent. of the force. The same Article of War, in the case of a company officer commanding a post, restricts the periods of furlough per man to 20 days in 6 months and the number of furloughs to 2 at a time. Army Regulation 116 allows a furlough of 20 days to be given as often as the commanding officer sees fit, and restricts the number of furloughs only to 5 per cent. of the force. These points raise the question whether the Articles of War or the Army Regulations are the higher law.

The Cavalry Drill Regulations tell us that the sentinels on outpost are double, or in pairs; the Infantry Drill Regulations give us to understand that they are single or double; according to "Troops in Campaign" they are habitually single. Similar instances might be cited of conflict between the Firing Regulations and Drill Regulations, and between the Army Regulations and Special Regulations. Sufficient has been said to suggest a greater centralization of authority in the preparation of our regulations or in their revision preparatory to approval.

No matter how excellent a code of regulations may be, it will not prove of the greatest utility unless it admits of ready reference; in other words, is fully and rationally indexed. A few features of the index of the Army Regulations will show the bearing of this remark. Numerical references are paragraphs of the Army Regulations. The arms, ammunition, accoutrements, and equipments that may be issued to officers (1704, 1705, 1706) are not indexed under the words *arms*, *ammunition*, or *accoutrements*. The word *equipments* is not indexed either by itself or under the word *officers*.

The following subjects are not indexed: *Candles* as part of the ration (1380, 1385); *civilian physician* (940, 1207, 1656, 1662, 1665); *commissary* (221, 266, 481, 650, 1110, 1352, 1353, 1354, 1374, 1403); *daily inspection* (296); *eleven p. m. inspection* (443); *monthly inspection* (218, 1615); *Saturday inspection* (296); *kitchen utensils* (1224, 1325); *payment of prisoners* (140, 1046, 1052, 1054, 1556); *sanitation* (1571, 1076); *treasurer* (327 *et seq.*, 335, 1501); *oaths* administered by Judge Advocates of Departments and of Courts-martial, trial officers of Summary Courts, and Recorders of boards of survey (765).

Suppose an officer is on detached service, and wants to find out what reports he has to make on that account. He turns to the word *Report* in the index of his regulations, and under this word he finds "Officers on leave," and "Officers visiting foreign countries," but nothing about officers on detached service. Going on down the column of sub-heads, he comes to the words "Personal Reports," and here is what he finds opposite to it: 66, 67, 74-76, 108, 112, 148, 895-898, 958, 1593, 1743—fourteen paragraphs among which to hunt for the one that he wants. In the business world, time is money. Fortunately

for our army officer it is not money in the military world. But unfortunately for the Government and the country, it may, in the military world, be more precious than money.

The Army Regulations should be provided with stubs between every two leaves for the insertion of orders amending regulations. The mere annotation of paragraphs of the regulations with the orders, circulars, etc., amending them does not answer the purpose of keeping one up with the subject. It is the exception rather than the rule that an officer has at hand a file of orders, circulars, etc., such as is called for by such references.

Owing to the frequent changes made in the Regulations, it has been suggested that a new edition be issued every year. Such an innovation would certainly be a boon to the average company and post commander. It would, perhaps, pay for itself. The cost of the additional printing and binding might be compensated for by the saving resulting from a closer observance of the Regulations. In this connection it should be observed that with a yearly issue of Regulations there would seem to be no need of Special Regulations. The present Special Regulations might be incorporated in the Army Regulations.

The burden of the clerical work of the army is the papers sent back for correction, the errors in which are due mainly to ignorance or misconstruction of the Regulations, and might be largely obviated by their thorough and intelligent revision.

In conclusion, it is to be hoped that in the next edition of the Army Regulations there will be no such small type as that used in the footnotes and in the bodies of pages 77, 80, 83, 127, 128, 152, 188, 189, 193, 195, etc. There is no part of the Regulations, the reading of which may not be of the greatest importance, and have to take place by the poorest light. As a matter of fact the parts that are printed in small type are of particular importance, and should be distinguished by large rather than by small type.

THE MEGAPHONE IN THE FIELD.

BY CAPTAIN JOSEPH T. DICKMAN, EIGHTH CAVALRY, U. S. A.

THE speaking trumpet, or as it is now frequently called, the megaphone, has a variety of uses arising from the fact that by its employment we are enabled to limit the dispersion of the sound waves of the human voice and to concentrate them in a desired direction, thus increasing distinctness and audibility to a considerable extent. Its invention is ascribed to Moreland, who in 1670 brought up the question of the best form for speaking trumpets.

The ancient form of this instrument has not changed with the advancing centuries, and the theory of its action has never been satisfactorily explained. It does not depend upon vibration; in fact, it is recommended that this be checked by an outside cover of cloth. It is supposed that owing to reflection the sound waves quit the instrument in practically parallel lines, thus limiting dispersion and increasing the carrying power.

The form under which the megaphone is now commonly found on ships is that of a cone several feet in length, made so indurated paper, and fitted with a wooden mouthpiece. It is very useful in conveying orders to members of the crew on deck or in the rigging of large ships, and in conversing with passing ships, lighters, pilots, etc. On land it is used on occasions of noise and confusion, for example, at fires, and in talking across streams and other impassable obstacles.

The absence of telephonic appliances on the target range at Plattsburg, N. Y., in the summer of 1899, and the necessity of communicating with the markers in the pit, suggested the advantages of the megaphone. Two were accordingly procured from a toy store in New York. After being cut down to about a foot in length they were attached to a cord, and could then be slung over the shoulder after the manner of the ordinary trumpet. They were found to be very convenient for the purposes above mentioned and also about the camp, saving much calling and running of orderlies.

One of its first uses after arrival in the Philippines was to convey messages to a signal detachment stationed on the bell tower at Jaro, Panay, eighty feet above ground. It was used in a night reconnaissance on the 18th of November, 1899, and in the battle of Balantang three days later. When the floating bamboo bridge across the Jaro River was carried away by a flood, communication with the isolated detachment at the Sugar Mill on the opposite bank was kept up by means of the megaphone. Subsequently it proved valuable in directing the movements of the wing of a deployed battalion east of Dingle, and in the hill country saved laborious trips of messengers across deep valleys. In wading through the *manglares* or salt water marshes and jungles of Panay, companies temporarily separated could still communicate, and it was possible to give orders to detachments in barotas some distance from shore. In thick weather, and especially on very dark nights when it is so easy for parts of the command to become separated unless the men hang on to each others' coat tails, it is only necessary for the commander at the head of the column to call back occasionally to the captains in rear to assure himself that all are coming along in touch. On a night march from Agtatacay to San Enrique, Panay,—it was a very dark night in February, 1900,—this method was used in keeping the men of a battalion in column of files closed up while passing over a rough trail, the head halting when necessary until assurances of "all right" came from the rear.

One of the advantages of the megaphone lies in the fact that the voice can be thrown in a desired direction where it will be plainly audible, whereas in other directions it will not be heard except in the immediate vicinity. Its use therefore would tend to reduce confusion and noise consequent upon vain efforts to make the voice understood in the ordinary way, and it would not be heard all over the country for long distances, thus giving information to the enemy, as is the case not infrequently with the trumpet.

The question whether suitable megaphones should be in the hands of a limited number of officers, let us say battalion commanders and captains, for use in campaign and on the field of battle, has probably not been sufficiently investigated by actual

experiment. We hear much these days about the difficulty of communication on the field and in the firing line, and of the danger to persons carrying bright objects such as swords and trumpets, but no account of recent attempts to use the speaking trumpet for war purposes has come to our notice. If it has been found necessary to increase the power of vision by issuing field glasses to all officers, and even to non-commissioned officers, would it not be of advantage to increase the power of the voice, and at the same time of the hearing, by use of the megaphone? Instruction and practice in the employment of signals are required in all armies, but of what use are they on the battle-field? Obviously, the party to receive a signal must be looking, and he must understand the signals, which will have to be made from a conspicuous position and therefore be visible to the enemy as well. Even with considerable practice signals can only be a very limited and uncertain means of communication on the march and in action. With volunteer troops, and for that matter, with Regulars largely filled up with recruits, the number of visual and sound signals which could be used without incurring risk of misunderstanding would be very restricted indeed. It would seem that for control of the line of skirmishers, or the line of squads, and to communicate with supports and even reserves, the megaphone might in many cases prove very useful, certainly more valuable than the trumpet. On the march in the enemy's country the trumpet was seldom used by us, the whistle or megaphone taking its place.

In the instruction of the company in extended order, in the supervision of squads or patrols in field exercises, in the instruction in target practice under field conditions simulating those of actual war, which will be introduced in our service in the course of time, and under many other circumstances, the megaphone will be found very convenient by those officers who can overcome the prejudice and perhaps ridicule against its use. In the field it is much to be preferred to the bugle or trumpet; and its use requires neither instruction nor "lip."

SOME DISEASES THAT ATTACK OUR ANIMALS IN THE PHILIPPINES.

BY COLEMAN NOCKOLDS, FIRST CLASS VETERINARIAN,
1ST U. S. CAVALRY.

IN the Philippines as in other tropical countries, it has been observed that the animals as well as the men are susceptible to the change of climate and suffer from a variety of diseases which are indigenous to the tropics. Without a doubt quite a number of army horses and mules have fallen victims to tropical complaints, but almost as many or even more have been destroyed because of the ignorance and inexperience of those in whose care these animals were entrusted.

The number of animals that have been destroyed that were supposed to be suffering from "glanders," for instance, has amounted to quite an alarming figure. In Batangas, Province of Batangas, glanders among the army mules and horses is quite an exceptional disease, although often a number of animals are destroyed on account of it in this vicinity and elsewhere.

I believe one of the most frequent diseases amongst our animals in these islands and one that has been mistaken often for glanders, with the resulting destruction of the animal or animals, is a tropical disease called "Surra," and which really has but little resemblance to glanders except to the uninitiated.

Surra (Hindoo for rotten) is an Indian name given by the English army veterinarians to a very deadly disease which often attacks both horses and mules of the Indian army. It has sometimes decimated the English cavalry in India, killing as many as fifty per cent. of the horses. It is common in Burma and Cochin-China and other countries in the warm and damp regions of Asia.

At the present time there are as many as two hundred animals, chiefly mules, suffering from this disease within a few miles of and at this post, Batangas, and something over one

hundred mules and several horses have either been killed or have died in consequence of this same disease, most of whom were supposed to be suffering with glanders. I was able to see a few of these animals before death and the diagnosis (*Surra*) was confirmed both by the microscopical examination of the blood and the clinical manifestations at the autopsy.

Quite recently there has been a general order issued prohibiting the destruction of animals supposed to be suffering with glanders or some contagious disease, but advising that they be isolated and kept under surveillance. This will be the means of saving many a good and useful animal that may for the time be a little under the weather.

Too much dependence has been placed on what is known as the Mallein test. Tens of thousands of bottles of Mallein have been shipped here for the purpose of diagnostinating glanders.

It is well known amongst professional men that too much dependence should not be placed in this test, and an animal should not be condemned for glanders even when a typical reaction is apparent unless other diagnostic methods are used or the clinical signs of glanders are pronounced.

Mallein has not been proven a typical reaction for glanders. Healthy animals often react to it, and it has been proven conclusively that other diseases, as pneumonia, lymphadenitis, and especially surra and bursattee react to the Mallein test.

Again, animals that are actually suffering with glanders sometimes do not show a reaction after the test has been applied.

It is quite probable that glanders has been caused by the use of bad preparations of Mallein. No doubt a large amount of the Mallein shipped to the Philippine Islands is deteriorated or rendered useless by the length of time it has been kept and by changes of climate.

It has been remarked that tropical glanders is curable and not of so severe a nature as ordinary glanders, but this statement is absurd, as it is caused by the same organism and exhibits the same manifestations here as in the United States; if anything, it takes a more virulent form here because of the influence of the enervating nature of this climate.

Surra, which is perhaps most frequently mistaken for gland-

ers, takes the form of a pernicious anaemia. It is caused by a small worm (an infusorium) which exists in the blood and attacks the red blood cells. They often number several millions in the blood of one horse.

Blood from an animal suffering from surra injected into a healthy animal will cause the disease; thus surra is contagious by inoculation. It is quite possible that flies and other insects may carry it from one animal to another. In this way it somewhat resembles the African tse-tse fly disease which is said by some to be identical with surra.

The commonest way in which surra is conveyed to horses and mules is by the drinking water and by the grasses growing on swampy lands. These lowland grasses form favorable resting places for the organisms.

The first symptom noticed is a well marked weakness, the animal often falls under the saddle or at work. This weakness is progressive, until finally the patient is unable to walk but a short distance and lies down most of the time.

One of the characteristics of the disease is the paroxysms of pain and fever, which last from a few hours to several days and between which intermissions of comparative ease occur.

During a paroxysm the temperature averages 41-42° C. During the intermissions it may be normal or even below. Respirations are hurried and the pulse is either irregular or faster than normal. The eyes of the affected animal have a peculiar timid, tired expression. There is extreme pallor of all the visible mucous membranes. Upon the conjunctiva and schneiderian membranes petechiae is often present. This must not be mistaken for the ulcers of glanders.

The position of the animal while standing is somewhat characteristic. The back is arched and the stifles, knees and fetlocks are flexed. The animal frequently falls down.

Œdema is present and the region under the abdomen, sheath, vulvæ and legs swell. Rapid wasting and progressive weakness soon render the animal unable to assume the standing position. Urine is frequently voided in small quantities. Throughout the whole course of the disease, even during the height of the paroxysms, the appetite is as good or even better than in health.

In summing up it is as well to mention the chief diagnostic points of surra :—

Paroxysms of fever with intermissions.

Appetite good to the last.

Extreme pallor of all mucous membrane visible.

Progressive wasting of health and strength.

Parasite in blood, taken from animal during paroxysm, visible under the microscope.

Upon post-mortem examination the lungs invariably are of a marbled color, showing signs of inflammation. Often the liver is large, rarely the spleen. There is a yellowish tinge to the tissues and an immense amount of yellowish, jelly-like material in the connective tissues of the chest, abdomen, muscles, etc. Often the pericardium and heart contain a large yellow blood clot. The large veins are filled with the same material. The lymphatic glands are enlarged and slight dropsy is apparent. All organs show signs of anaemia. The mucous membrane of the stomach and intestines are, with the exception of being a little paler than usual in a good, healthy looking condition.

The duration of the disease is from two weeks to two months. One attack does not protect the animal from a second.

Surra may be prevented by having a pure water supply and not feeding grass or hay taken from swampy lands and by providing proper shelter for the animals.

The treatment consists in giving arsenic or quinine. Arsenic is preferable, commencing in five grain doses twice each day for two or three days and then increasing the dose one-half a grain each day until the dose has reached seven grains, which amount should be continued for a week, when the dose should gradually be lessened each day until four grains has been reached.

Quinine in half-ounce doses has cured several cases which have come under my observation.

Iron should also be given as a blood tonic.

Grain and hay may be given as usual. If the grain contains the excrement of rats, mice, etc., it should not be given as these are said to contain spores of the parasite.

Bursatte is another disease which is peculiar to warm climates. It is characterized by the appearance of bright red gran-

ulation ulcers which have a hard base and a soft centre composed of granules varying in size from a millet seed to a pea.

These ulcers are circular in form and may break out in various places on the skin. They are supposed to be caused by a filiria. They cause intense pain and are very unsightly. In the majority of cases they are incurable.

Another trouble that is common here is known as adhobe itch. It is a dermatitis caused by a vegetable parasite and of course itches intensely, causing the animal to bite, scratch and rub itself. The hair falls out in patches, the animal sometimes being almost denuded of hair through this troublesome complaint. After some time the skin becomes thickened and cracks.

The treatment, after thorough washing with castile soap and water, is to apply a solution of salicylic acid in alcohol directly to the raw surfaces, or a wash made up of lime and sulphur.

This is an exceedingly contagious disease and upon the first appearance of it the animal should be immediately isolated.

Contagious pan-ophthalmitis is of frequent occurrence amongst the animals. Many of the native ponies suffer with it, and most probably our horses have caught it from them, as in those troops to which no native ponies have had access there is neither this trouble nor adhobe itch.

It is probable that the spores of the parasite that cause adhobe itch are found in the mud, weeds and water about the corral, yet the fact remains that in those corrals that have not admitted native ponies neither pan-ophthalmitis nor adhobe itch exists.

Pan-ophthalmitis is due to a specific germ which no doubt is carried to the eyes by the wind. The animal weeps most of the time and keeps the eye half or fully closed. The eyelids are swollen and there is a bluish white layer covering the cornea. Later the whole eyeball becomes infected and usually total blindness is the ultimate result.

Sometimes this disease appears and then apparently goes away for a time, but in a few weeks the symptoms come on again in a more severe form than before.

The treatment consists in bathing the eye in warm water and applying a solution of boracic acid, creoline or bichloride

of mercury and giving internally arsenic in two-grain doses twice each day for a month or more.

In all diseases where there is fear of contagion the animals that are suspected should be separated from the healthy ones.

Disinfectants should be freely used. As a preventive for many of the diseases peculiar to the Philippine Islands pure drinking water should be given.

Native grasses from the lowlands should not be fed, as it is a well known fact that many of the parasitic diseases have their origin from the ingestion of organisms which live on the damp, coarse grasses of the water of the swamps.

Native ponies should not be allowed in corrals with healthy American animals, for many of these ponies suffer with disease, while many others, not actually suffering with disease themselves, act as carriers of disease to our animals.

One method of lessening the mortality of our animals, in these islands, would be to employ only these men as veterinarians who can prove, by a thorough trial examination in theory and practice, that they are qualified to be intrusted with the care of animals. It is a deplorable fact that the majority of men sent out here for that purpose are men of absolutely no veterinary training and their places would be better filled by the average teamster.

Batangas, Luzon, P. I.

October 22, 1901.

MEMORANDUM ON "THE KNELL OF THE VOLLEY."*

BY MAJOR JAMES PARKER, U. S. CAVALRY.

SUCH does not seem to have been the experience of our troops in the Philippines.

It is believed that independent fire should be permitted only in either of the following cases: (a) When the troops are all good shots and are accustomed to being under fire; (b) When the circumstances are such that no failure in ammunition supply is possible; (c) At very short ranges, where deliberate aiming of a line will afford the enemy a good target.

Volley firing means fire control. Independent firing, necessarily, as to many men, means lack of fire control. Let us consider what takes place on the firing line. In volley firing, the orders of the commander are "1st. At the enemy at so many yards; 2d. Fire three volleys; 3d. Aim; 4th. Fire." Before the first command the officer makes a careful estimate of the distance. After the first command he has a chance to indicate and describe the object and to see that sights are adjusted. After the third command to look along the line of guns and see that the rifles are properly directed. He controls the expenditure of ammunition.

Poor shots, and even good shots, when first in action are liable to become unduly excited, if not controlled. Under these circumstances the rifle is hurriedly loaded, little or no attention is paid to the sights, and the soldier in perfect faith that he is doing great damage to the enemy, wildly fires in their general direction. There is nothing to calm him, the voice of his commander can hardly be heard, and the result often is, the more he fires the more he gets excited. It is no uncommon sight during hot independent fire, to see a soldier, lying behind cover, discharge his piece at an angle of 20 or 30 degrees from the horizontal. As the ammunition is rapidly consumed the men lose confidence in the outcome. Controlled fire, alternated by

* See "The Knell of the Volley," the reprint immediately following.—ED.

rushes of sub-divisions, is indispensable when advancing on a position.

Volleys, on the other hand, have a calming, reassuring effect on the men. The commander speaks deliberately, he minimizes the losses, he praises the effect of the volleys. The men aid the officer in selecting the object for the next volley, where it will do most harm. The men, with full belts of ammunition, are full of confidence, and a new fire opened from the flank does not disturb them. To the enemy, on the other hand, well regulated volleys prove that our men are not demoralized and this reacts on their *morale*.

The capture of a position by direct attack, presupposes extraordinary confidence on the part of the attacking party and a correspondingly lack of *morale* on the part of the defenders. In fact, the defenders, even with unlimited supplies of ammunition, are liable to a sudden panic, ending in withdrawal, if they become imbued with the idea that all their efforts have been in vain, that their fire has been misdirected and useless, and that the enemy has suffered few losses, and is constantly getting nearer and nearer, in increasing numbers. Such panics can be averted by controlled fire.

At very short ranges, when the sound of command of the enemy can be heard, his volley firing affords an opportunity to take advantage of the enemy's deliberate movements and to use individual fire, or sharpshooters' fire, with advantage. The appearance of a long row of heads gives the individual marksman a chance to fire with precision and dodge behind his cover before the answering volley is fired. Hence volleys are not suitable under such conditions.

It would seem that certain conditions of warfare, now even more than formerly, would require at *long* ranges the use of volley firing, in order that ammunition should not be uselessly expended. At these ranges the distance and the use of smokeless powder, makes it very difficult to determine the target. There is no smoke to show where the bullets are coming from, and the use of field glasses in determining the position of the enemy becomes more necessary. Again, at the longer ranges, an error say of 200 yards in the distance of the target is more serious than the same error at short ranges. In order that the men's

sights should be properly fixed, the objective properly pointed out, it is necessary that the fire be controlled. Else the men will be firing, some at one objective, some at another ; some with the sights properly adjusted, some not.

An ideal command would be one in which the men were all good shots, good at estimating distances, used to being under fire, and always under such control that the firing can be stopped in a moment ; never wasteful of ammunition. With such a command volley firing is not necessary ; but these conditions can never be arrived at.

It is believed in this matter we have nothing to learn from the English. Their experience in Africa was not sufficiently successful to be conclusive. The contention of Lord Roberts that they found volley firing "practically impossible" raises the question of to how great an extent this "impossibility" was due to the failure of the officers to control the men. We think it can be shown that no such difficulty arose in the Philippines, with Regulars or Volunteers. The officers on the firing line, usually at long ranges, and often at short ranges, decided in favor of volley firing and no difficulty was found in keeping the men to that class of fire.

On the other hand, it was often noticed that with the insurgents, who were notoriously without confidence in their officers, the firing at the beginning of an action was by volleys, and was effective ; and that it soon degenerated into independent and uncontrolled fire, which was without effect.

To secure an authoritative decision on this matter it is recommended that a list be made of those officers who were most often under fire in the Philippines, and that a circular be addressed to each of them for the purpose of obtaining their opinions. Such opinions, if collated, will go far toward determining what class of fire is suitable with our men and in our service. The foregoing is submitted to the JOURNAL OF THE MILITARY SERVICE INSTITUTION in the belief that discussion of this question may lead to good results.

NOTE.—These views are concurred in by Colonel Jesse Lee, who says that our troops made use of controlled fire at Tientsin.

Translations and Reprints.

THE KNELL OF THE VOLLEY.*

(United Service Gazette, Aug. 3, 1901.)

THE passing bell of volley firing has sounded—and yet previous to the present war volley firing was held in high esteem. It is true that soldiers who had had the opportunity of seeing actual fighting in the many wars of greater or less importance in which the British Army has been constantly engaged during the last thirty years, were not greatly enamored with it, but by a large school in the Service it was viewed with the greatest favor. It was held to be pre-eminently the one effective form of musketry fire; the kind of fire which might and should in the great majority of cases be employed on the field of battle. In the "Infantry Drill" Book of 1896—which, by the way, has not yet been superseded by any amended edition—it is laid down that "volley firing will be maintained during the development of an attack until the captain orders independent firing," and later on it continues: "Independent firing is, as a rule, only advisable at decisive ranges." In the "Musketry Instructions" its many virtues are dilated upon at length. The object of this firing is, we are told, to bring a sudden and concentrated fire on the objective. It admits, it is further stated, of complete control with regard to direction and concentration. It admits of correction of elevation and direction. It enables the expenditure of ammunition to be regulated. It keeps the men well in hand, and is an aid to discipline, and finally, we are told that it should be used during the attack at long and medium ranges, and in the defence at all ranges.

And now Lord Roberts has declared that this fire of such manifold virtues is "practically impossible." The curious thing is that this truth—for truth we believe it to be—should have for so long remained unrevealed to those responsible for the form which the musketry training of our soldiers should take, and for the regulations prescribing the kind of musketry fire to be employed in actual warfare. It is a further curious coincidence that just at the time when volley fire has come to be thus unreservedly condemned by the highest authority in our army, we should also hear again that the great Napoleon, after years of observation, arrived at the same conclusion that Lord Roberts has now come to. This, of course, may be gathered from the well known "Memoirs" of Napoleon, but we find it now repeated, and in more definite words,

*See "MEMORANDUM" (on this subject) by Major James Parker, U. S. A.

in a very interesting work which has been just published by the Librarian of the town of Bordeaux, entitled "Notes inédites de l'Empereur Napoleon I. sur les mémoires militaires du Général Lloyd." This is a reprint of a book covered with marginal notes, by Napoleon himself, during his captivity at St. Helena, which was picked up accidentally on one of the second hand bookstalls on the quays of Paris, and which luckily fell into the hands of a reader able to appreciate its value, and one of the notes in Napoleon's own handwriting runs: "No fire has any value and none is practicable in war except independent fire (*le feu à volonté*)."

"It is likewise of interest that the project of the French Regulations on Infantry drill and exercises also suppresses volley firing."—*Revue Militaire Suisse*. September, 1901.

LESSONS OF THE SPANISH-AMERICAN WAR.*

BY D. VICTOR M. CONCAS, CAPTAIN IN THE (SPANISH) NAVY,
VICE-PRESIDENT, GEOGRAPHICAL SOCIETY OF MADRID.

(Translated by F. H. P. for this JOURNAL.)

I.

SINCE the very day war was declared between Spain and the United States, there has not been a writer, politician or publicist, who, whether he was of any account or not, has not pointed out to the world examples, written of the successes and deduced consequences therefrom perfectly in accord with forecasts and previous discourses or writings; and, in the majority of cases, they have but invented the facts and distorted the successes in order to make them conform to their own theories, that they might exhibit their own clear-sightedness; though in the light of truth and history the events related have about as much to do with the Spanish-American War as the campaigns of Xerxes.

Scientific value is not to be denied to the majority of these studies, when considered as abstract disquisitions by professional students; but the only way to make a study of a war that has terminated, is to describe it just as it was, and not as it might have been, according to the judgment or convenience of the author, while for our part, having been an active participant in it and with all opportunity for correct information, we can certify that many of the conclusions drawn have been altered or invented by those who profess to be well informed, among them the lengthy articles published from March to October, 1900, in the *Rivista Marittima Italiana* (Italian Maritime Review), by the well known Italian

* Published in pamphlet by the author at Bilbao, 1900

publicist, Mr. Bonamico, under the title of "Insegnamenti della Guerra Hispano-Americana" (Teachings of the Spanish-American War).

It is certainly more reasonable to treat of an Italian writer, for we might hope from Spanish or Italian naval writers to get a quite different class of studies, of which we have had but very few for a long time—with the more reason, for indeed there has been great lack of them—studies the more easy in regard to the two peoples cited, for in studying ourselves and in seeing our own virtues and defects, we can get to know one or the other of the Latin peoples, and in recording their history of yesterday, so little distinct from that of our own times, we will deduce for ourselves lessons; for peoples display themselves, as individuals always do, little because of the peculiarity of their blood (which, good or bad, pertains to every people and every individual, be he whom he may), and do not give themselves up to dreamy adoration of people not of their own race.

Thus, as there is not ascribed to us judgment sufficient to know the Spanish people, to suppose that Admiral Cervera could and should have decided to act regardless of the cries from the *piazza* (market-place), as an hundred times Bonamico contends—for if the cries from the market-place are those of the entire nation; if to those cries are added a mass of pressure and at the head of that movement of greater or lesser advantage the Government of the country places itself, desperate as the case was, there is not in Spain nor in the entire universe an admiral capable of disobeying, though Colomb so prominently suggests it—then either military corporations are arms of a headless body or military discipline is a myth, and society which creates such elements would be ready to give itself up to the mercy of the first leader that came along prepared to carry out the most original theories actuating him.

What is certain is that not to have had the squadron go to the Antilles would have been the salvation of the Philippines, perhaps of part of the Cuban debt and forever of the terms of the ominous peace! There is no doubt! And for that strategic reason, so well maintained by the great American writer Mahan, it should not have gone! By no means!

But all that which are most weighty reasons why he should not have been commanded by whomever had the disposition of him, are not the least argument to advance for the convenience, if not the obligation, of a disobedience justifying itself in facile arguments from acts committed and maintaining theories more dangerous for the security of the state than the loss of an hundred squadrons, and tending to the loss of that respect for law and authority which it has taken twenty cycles of sacrifices of the civilized world to secure.

Admiral Cervera had a right to give his opinion, and he gave it with thorough virility. He submitted his opinion to his captains and they gave theirs with equal energy. He received the order to go to the Antilles, and one and all obeyed, and it did not enter their imagination to

submit their opinions to a council of war, as Bonamico says, for while giving their opinions they obeyed—obeyed in compliance with superior orders, without any ideas of romantic indiscipline occurring to any of them, which only enters the minds of novelists.

Led by Wilson, and without any investigation, Bonamico, equally with many others, discourses about the Spanish torpedo boats. In regard to that matter, it occurs to me to recount the story of him who was describing the pains and dangers attending his aunt's childbirth, in which connection we had to observe that the aunt had been dead twenty years before, and that it was the uncle and not the aunt who was staying at the place of the alleged occurrence; and the historian got out of it by saying: "but if it had been my aunt!" And thus we do not know how it ever could have entered the heads of the many who have held such disquisitions about torpedo boats, of which neither in the Antilles nor in the Philippines there was not one, not a vestige of one, nor the shadow of one. But if there had been! If, indeed, it had been the aunt, but it was the uncle and no one else but the uncle.

Unfortunately, we had no torpedo boat in the sea of operations, and the only three that they thought of sending there and which never passed Cape Verde were surely one of the determining causes of sending the squadron to the Antilles. There was not, unfortunately, sufficient energy either to send them or to permit them to be sent there; thus, as they accelerated or paused a step, according as they oscillated between an intention to send them there and the fear that thereby they would furnish a *casus belli*, the three never reached their destination and were ordered to go back from the Cape Verde Islands, consequently, all the lessons obtainable and censures made are not of those things that did take place, even though perhaps they are of those that might have taken place.

Bonamico ridicules my words of defence when I say that Dewey attacked Admiral Montojo's squadron with cold business-like cruelty ("cruel frialdad à modo de negocio"), but surely he could easily have read it before, for on page 48 of the printed defence it says, "In the United Service Institution, page 440 of the publication of that year (1899) Admiral Colomb says, 'Dewey kept himself at such distance that neither the ships nor the batteries could give adequate return to his fire, delivered with cold business-like cruelty on the part of the Americans; and there followed a pathetic parade of Quixotic valor on the other side.'"

And in the page following I say, "The battles were conducted, *as they always should be*, in a business-like way."

In regard to *business-like way*, it was not Concas who said it, but the well known Colomb, now deceased; and neither I nor any other Spaniard have thought the case merited ridicule; while, on the contrary, it stands recorded that I conducted myself perfectly naturally, *in war, as in war*, from which is to be deduced, as a classical teaching, that if it had been the aunt, as it was the uncle, the fact might have been as Bonamico recounts, but, however, it was quite the contrary.

Copying Wilson, without further criticism, Bonamico ascribes to the Spanish forces the armored cruiser *Cataluna*, which was launched upon the waters on September 4, 1900; that is to say, two years after the establishment of peace; he also credits to them the other armored cruisers of 7000 tonnage—*Cisneros* and *Princesa de Asturias*—which even to-day have not yet taken their trial trip; the unfinished cruisers *Alfonso XIII* and *Lepanto*, and a body of colliers, of whose numbers I, Major Chief of Staff of that squadron, have never heard; and upon this as his only basis of supposition, he discourses largely about the utilization of such colliers, with severe words for the Spanish Admiral, which we generously pardon, taking inspiration from the words of our Lord: Father, forgive them; they know not what they say!

But it is true that the steamer *Alicante* was put at the disposition of the Admiral, but the *Alicante* was a hospital ship, not a collier, was in Martinique, and, supposing that her hospital fittings were removed, she could only take a full cargo of coal. Would they have given it her? If they had, could the object have been concealed? Would she ever have arrived at Santiago? When? Perhaps in September, 1900, when the cruiser *Cataluna* was launched!

“Undici navi moderne di oltre 17 miglia de 80 mile tonelate.” (Eleven modern war vessels of over 17 miles speed and 80,000 tonnage.) (Page 230.)

Thus is history written!

A subject of much discussion is the thesis which Bonamico maintains, in magisterial and not always correct sentences, that Cervera should have taken his squadron to Cienfuego, which authorizes us in our turn to say that if such course had been taken it would have exhibited great incapacity. Cienfuego was at the base of a gulf which could easily have been blockaded from an hundred neighboring anchorage grounds; one shore of its entrance was open to and dominable by the artillery of ships which under their fire could have disembarked 200 men, who could without molestation have removed the torpedoes; the islet constituting its mouth could not possibly have offered resistance to the forces of an army approaching from the sea, and was not defensible from the other interior shore of the port, with its woods and low ground. The armament consisted of two Krupp cannons—of 9 c/m—and of two Honorias of 12 c/m, borrowed from the navy, and some old cannons whose projectiles could not reach the sea.

The mouth of the port once taken and the American squadron concentrated there, what could the Spanish cruisers have done with 40,000 men shooting Mauser bullets against the sides of the *Oregon*? And, from the necessity of disembarkation, as was precisely the case in Santiago de Cuba, there was no reason for not taking the mouth of the port.

It is certain that the United States could easily have blockaded it, but there were two reasons; the first was, it would have been a desper-

ate act for Cervera's squadron to attempt to get munitions from Havana—which we submit to the consideration of every competent person—for if vessels start out sure to have to cope with superior forces, they would go overloaded with powder and grenades, while to-day almost every ship is provided with its own; and the second reason was the mercantile blockade, for it is evident that a blockade of Havana would be of little avail if the ports connected with it by the network of railroads were left open.

Ignorance of places and circumstances of the war is noticeable in almost all writers—less so among the American—for without it Bonamico would not have censured as he did the march of Escario for having consumed eleven days in covering 180 kilometres, traveling over roads almost always in single file, through completely virgin forests, in a mountainous country, assailed on the flanks and impeded by trees thrown across the roads, as was the tactics of the Cubans, thus making his progress more difficult. * * * We are not to be accused of partiality, if we say that the only writings worthy to be referred to are those of American publicists, with few exceptions (for Jingoes are always to be found), and also that written in England which is solely derived from such sources as the articles by Colonel G. S. Clarke, and is published in the Brassey Annual of 1899, the last lines of which acknowledge that all the data were furnished by the naval captains F. E. Chadwick, C. F. Goodrich and the frigate captain J. S. Colwell, all of the United States Navy. And besides these, the Spartan narrative in documents published by Admiral Cervera, and permit me to add thereto my book, *La Escuadra del Almirante Cervera* (Admiral Cervera's Squadron). * * *

To judge of war as you would manœuvres in mimic warfare leads to great errors; for if the manœuvre be that of taking a port, for example, it is a movement in a case where such operation was comprised in the plan of campaign; but in real, effective war, regard should be had always to its finality only, and a port should not be approached nor any position whatever, nor a force sent to the field of operations, without first knowing what is likely to take place there and what new situation might result from the intended operation.

To make a sortie just for the sake of sortieing in the face of immensely superior forces, as is contended in so many writings, does not stand the least criticism; and if at the time of the war opinions were held that the squadron should leave Cuba for Porto Rico, it was because of the pressure of hunger prevailing, and to better the situation in selecting the port designated by the Government, not to select Cienfuegos which would have been an exhibition of the greatest strategic nullity.

II.

The circumstances of the war not only escape unnoticed by the Italian critic but they are the object of his greatest confusion.

In the first place, he contends that Cuba was poorly situated for a blockade, while, on the contrary, never were the conditions more favorable to the blockaders. In fact, around the Island of Cuba was a "seedstring" of islands in which the sympathies were all for the Americans; there were spies and sympathizers everywhere; the Mole of St. Nicholas, in neutral Hayti, was a base of operations for the United States squadron; Jamaica, so-called neutral, was another base with all its consequences. In that island there was a successful revolution which gave them aid; the Spanish population, in great part, fearful of jeopardizing their interests, scarcely preserved appearances; and the masonic societies had control even of the principal centres of government. There were people thoroughly familiar with the country, confidential agents; they had ports, their own bases of operations in the Tortugas and Key West, the only fortified port on the northern coast. And if those are difficulties, we ingenuously confess that the campaigns of Suffren in the Indian Ocean and those of Mendez Nunez in the Pacific, thousands of leagues from his country, and hostility everywhere, are to be considered so mythological that they are not at all to be comprehended, if the blockade of the Island of Cuba can be called difficult.

As Admiral Cervera said in one of his circumspect communications, for a long time Cuba had not been Spanish; the very Spaniards who figured there principally—almost all—sent contributions to Maximo Gomez to prevent the burning of their plantations, while in Madrid their voice was heard in the higher circles, or they enjoyed life in Paris, living on their incomes; a detachment of the army guarded their mills, thus breaking into fragments and weakening our forces. At these mills periodically and punctually appeared the insurrectionists, firing a volley or two in the air at four or five thousand metres, which were returned by the detachment, as if to show that the owner of the property was not an insurrectionist; and the stipend agreed upon being collected they continued on their way, levying similar contributions *en route*, laboring in the field just as if the detachment existed thus by aiding and abetting the enemy—when a match applied to their cane fields would, in a second, have terminated such a comedy. If, with such auxiliaries, the war was difficult, we confess our ignorance of what is an easy war.

We do not refer to that mass of uneducated Spaniards who had nothing to lose and were genuine patriots, in voice and action on the battle-field, but to that cultured and wealthy people who should have been better partisans of Spain—the illustrious Cubans, true nationalists, not from sympathy, but from a thorough knowledge of the country and the future they hoped for—even independents, even Yankees, who were ready to put themselves in the hands of the colored races.

The Spanish government was so certain there would be no war that even in the very midst of it they gave themselves up to the most optimistic blindness, so much so that on the 12th of April of the same year—1898—it was said at the Philippines that there would be no war; and

on the 29th of the same month, eight days after the breaking out of hostilities, Admiral Cervera started out with his squadron, without any clear and definite notification that war had been declared and that Spain had accepted it, whether willingly or unwillingly.

Still treating of the writing which has been occupying our attention, and which vaults from the Occident to the Orient, seeking to include in one the lessons of the war, he commits similar errors in appreciating the situation in the Philippines. There was no extensive insurrection there, as was supposed, for the only dominant insurrection existed in the province of Cavité, reduced to embers by a great conflagration. There, notwithstanding that Bonamico affirms the contrary, they seized upon the idea, set forth in my defense of Admiral Montojo, of sending the naval forces among the Southern reefs, an analysis of which is not given by the Italian critic, which in this case, more than in that of the Antilles, exhibits ignorance of facts and locality, as we will proceed to show in few words.

In the streams and reefs of the South, among islands whose peoples were all friendly, with the waters full of reefs, with five or six knot currents, without means of communication, without cables, with no large cities to attack, Dewey's squadron would have failed of its mission, and would hardly have been able to decide to attack, when all his lines of communication were threatened. Of course that would not have concluded the war, but it would have afforded much needed time to divert the conflict to the Antilles or to the Peninsula, where it should have taken place.

But let us see what that signified in the Philippines. In the first place, the burning of all vessels whose machinery was unserviceable at sea; the burning of the arsenal which as an arsenal against invasion was far removed from the forts and indefensible from the sea; the necessity of desolating the city of Cavité, mostly populated by Europeans, which, once desolated, Dewey would not have been able to attack, defended as it was by sharp-shooters from the surrounding shores and a couple of batteries within its solid walls, nor could he have destroyed it by any expenditure of ammunition. In addition to this, the resolution to suffer the bombardment of Manila, together with the decision to concentrate, as was determined, all the European forces by the Daguan railroad, to bring subsistence to the capital and to the people in the interior who announced themselves as refugees; and the concentration of the European forces would be to abandon the numerous European population, scattered all over Luzon, which would have made an advance of the American forces accompanied by Aguinaldo very difficult.

* * *

There have been entertained severe charges against the batteries of Corregidor because they did not take part in the battle of Cavité, when the absurdity of the matter was that they had guns which had to impas-sively view the combat; this by itself should call attention to the fact

that the batteries were situated 21 or 22 miles from the scene of strife, and that almost all the territory of San Roque intervened in a direct line of one of the batteries, and only by sending its projectiles by rail could it take part in the action—such are the very grave, very light and very offensive charges that are entertained. And at the very last, what official party, American or Spanish, had the idea that the battery of Sangley point was useless, when it fired when it liked? Dewey who attached more importance to it and who had reason to suppose that there was more artillery there and who says that it caused no damage, which is more positive.

Returning to the Atlantic, we repeat that in Spain there was a dominant optimism which, absurd though it was, was none the less positive. No one believed in the war, and the very ones that saw it was inevitable supposed it yet many days off, and it was even contended, concerning the colliers, that they could contract for them in England after the squadron had departed; that is to say, they had but to hunt them up, send them to Cardiff, load them and they would be at their destination; it was evident, consequently, that they could not arrive before the squadron, beaten or not beaten, would be blockaded; all which could have had no influence with Admiral Cervera, nor in selecting the Cape Verde Islands, which, however, he never selected, but he was sent to them where he could not obtain colliers, not even the needed coal, on the pretext of a strike at Cardiff, and that, too, in time of peace. A single collier would have changed the face of operations. But we cannot sufficiently emphasize the fact that the squadron was driven to the Antilles without any colliers at all. It is not open to the slightest serious discussion, to maintain that a military power should send him forth without recourse, without munitions, without coal in the navy, without a military port, without support, right into the jaws of the wolf and then to tell him—there, make the best of it! If Admiral Cervera had had election of his operations, history could have accused him of not knowing how to make the best of what was at his disposal, but the only thing they left to him was to elect the manner of his destruction, knowing that which the blind have since been able to see; that was, that his destruction was the rendition of Spain, and that when the four valiant battleships went forth from Cape Verde they "went irremediably sentenced" (Mahan).

(Concluded in May number.)

VON LÖBELL'S ANNUAL REPORTS ON THE CHANGES AND
PROGRESS IN MILITARY MATTERS IN 1900.*

PRÉCIS BY LIEUT.-COL. E. GUNTER, P.S.C.

(*From the Journal Royal U. S. Institution.*)

II.

BELGIUM.

THE question of army reform is still awaiting the complete report of the Army Committee. The war establishments of 23rd December, 1899, show a strength of 9 Infantry Divisions, no Army Corps being formed, and 2 Cavalry Divisions of 2 brigades of 2 regiments each.

The war establishment of an Infantry Division is as under:—2 brigades infantry, 1 battalion divisional infantry (carabineers), 2 squadrons divisional cavalry, 1 regiment field artillery (8 batteries); 2 infantry and 2 artillery ammunition columns, 1 field company R. E., 1 section field telegraph, 1 detachment R.E. park, 2 field hospitals, 1 hospital train, 1 transport, 1 supply column, 2 provision columns, 1 transport and supply park, and 1 movable remount dépôt.

The total war strength would be about 140,000 men, the battalions being about 1,000 and the squadrons about 160 strong; the field batteries 166 and the horse artillery 180 strong, each having 6 guns.

ENGLAND.

The Report deals in twenty-three pages with the organisation of the British Army in 1899 and its subsequent reinforcement, distinguishing carefully temporary from permanent changes; and considering the great complication that has attended these, it does the compiler great credit. That our War Minister should be styled Sir John Brodrick is natural enough. Perhaps if he is not, he ought to be.

The report recognises that Great Britain can on emergency greatly increase its permanent forces by means of its Volunteers and Colonial troops, and that 3 Army Corps and 3 Cavalry Brigades, comprising a total of over 500,000 men, could be made available for Home Defence in 1900, though only 24,000 "A" Reservists remained over and above the large numbers in South Africa. It notices the permanent formation of Major-General Baden-Powell's South African Constabulary and goes much into detail regarding our recruiting reports, characterising that of the Inspector-General as far too rose-coloured, and says that, when the war in South Africa is over, not only will recruiting for the Line fall off, but it will be impossible to obtain the required number of men for the Militia by voluntary recruitment; still, that the patriotic behaviour of employers of labour in throwing open places to reservists and keeping open those of men called out for Active Service will bear fruit and encourage recruiting.

* Concluded from (January) JOURNAL M. S. I.

The Report notices the fact of the embodied services of Militia officers counting as marks towards their competitive examination for Line commissions, and that all infantry and cavalry officers must obtain a Hythe Musketry Certificate before they can be promoted. It gives a minute account of the formation of new camps of exercise and of the measures taken for the tactical training of the troops in 1900, and gives Lord Wolseley credit for his energy and fearless criticisms. It touches on the Cyclist exercises from London to Brighton under Sir J. F. Maurice, and the issue of the "Cyclist Drill." Under the head "discipline" the Report asserts that owing to the British military prisons being all full to overcrowding, 300 soldiers had to be imprisoned in civil jails.*

The failure of the light field picks and shovels carried by our Infantry, who could make no impression on the rocky ground with them, is commented on.

FRANCE.

The organisation of the French Army remains as reported last year, but a few changes, chiefly increases of establishments by the formation of additional battalions, etc., are noted.

Though no official reports have been published, it is gathered that the French could put 5 Armies in the field, 4 on the Eastern frontier and 1 in the Alpine region. Generals Duchesne, Lucas, Kessler, Negrion, and Zédé are said to have been nominated to command these, which will consist of 4 Army Corps each (excepting the Alpine troops of 2) with General Brugère as Commander-in-Chief.

The strength of the units would be approximately as indicated in last year's Report. The Rifle Battalions of 6 Companies would have 26 officers, 1,500 men, and 40 horses. During 1900, 93 regiments (rather more than half) had their 4th Battalions raised. The 4 Zouave Regiments had raised their 5th Battalions. Two new Colonial Marine Regiments were raised, and the 2 foreign Regiments had their establishments increased, by raising an extra battalion each, so that each now consists of 6 battalions.

The re-organisation of the Artillery is not quite complete, but the abolition of the Corps Artillery is contemplated, and the formation of 4 gun mobile batteries for distribution among the Infantry Brigades of each Division.†

In the Cavalry, 20 selected intelligent, well-educated men are to be specially trained as scouts in each squadron, a proportion being distributed to each of its sections. They are to be especially well-mounted. They are distinguished by a star on the right arm.

The Colonial Troops have now all been placed under the orders of the War Minister. General de Gallifet retired from his position as War

* The writer is apparently unacquainted with our regulations under this head.—TRANSLATOR.

† It will be remembered that in 1809 Napoleon attached 2 guns to each Infantry Regiment.—TRANSLATOR.

Minister after having held office barely a year, in consequence, it is said, of differences in the Cabinet. By his great energy he had already done much. To him is due the rapidity with which the new field gun has been supplied, the improvements in the rifle, many important changes in the regulations, the re-organisation of the General Staff and of the Artillery. He was succeeded by General André, Commanding the 10th Division, originally an Artillery Officer.

* * *

It is in contemplation to arm all Dragoon Regiments with the lance. A new Infantry Drill is being compiled by a Committee, presided over by General Lucas, and composed of Cavalry and Artillery as well as of Infantry officers. One company in each regiment is directed to practise the new drill.

Military Education.—New entrance examination regulations to the *École supérieure de la Guerre* (Staff College) were promulgated in 1900. The Examination consists of a preliminary and a final test, the latter in Paris. Six problems are set in the first on Tactics, Military History, Military Law, and Administration, one German Test and a Field Sketch. At the final written examination a problem was set in each of the following:—Geography, Topography, Fortification. *Vivā voce* questions were given in Tactics, Organisation, and German. 23 captains and 57 lieutenants passed this examination.

The École spéciale Militaire.—During the first year all Cadets go through the same curriculum. During the second the Cavalry and Infantry are separated, 520 Cadets are admitted. The lecturers are chosen by the War Minister.

The best German account of the re-organised French Army is that of Colonel Hepke, which is embodied in a volume of 600 pages, and is most exhaustive. It is called *Das französische Heer am Ende des neunzehnten Jahrhunderts*.

GERMAN EMPIRE.

There are but few changes to note in the organisation of the German Army in 1900.

Mounted Rifles.—On 1st October, 1900, 3 squadrons of Mounted Rifles were formed, one attached to the 11th Hussars (VII. Corps) at Wesel, and two attached to the 14th Hussars (XI. Corps) at Langensalza.

The Staff of a III. Bavarian Corps was formed on 1st April, 1900, at Nürnberg. Of this corps the 3rd Division has 1 Brigade and Division Headquarters at Nürnberg, and the other at Bayreuth. Its 6th Division has 1 Brigade and Division Headquarters at Regensburg, and the other at Ingolstadt. The 3rd Cavalry Brigade is quartered at Nürnberg and Bayreuth.

A new Military Map showing the territorial distribution of the Army Corps and Divisions, etc., was published for 1901 by R. Schröder of Berlin.

The new Code of Military Law, etc., came into force on 1st October, 1900. Each Army Corps has now in its command a Brigade-Division of 3 Batteries of Light Field Howitzers, which is attached to one of its Infantry Divisions.

A "heavy" ration of 6 lbs. oats and 3 lbs. straw per diem is now issued to horses drawing heavy guns at manoeuvres.

By an order of the Secretary of State of January, 1900, several more of the better-paid appointments in the Post Office were to be kept open for old soldiers. 6 weeks' courses of training in Field Telegraphy were held in Königsberg, Danzig, Thorn, Posen, Köln, Mainz, Strasburg, and Metz for soldiers. 14 days' practical Field Artillery courses were held, which were attended by Divisional and the senior Brigade Commanders and by Commanding and Field Officers. 2 months' courses were held for Captains and Lieutenants at the School of Musketry at Lechfeld in Bavaria, as well as 5 weeks' courses at Spandau. Courses at the Infantry Instructional Battalion were attended by Captains and Lieutenants. Engineering courses for Commanding Officers of Infantry, which lasted 12 days, were also held.

New regulations for the annual General Staff rides were issued.

* * *

In accordance with the German Emperor's order to abolish all foreign terms in nomenclature, all the Metz forts are now styled *Feste Kronprinz*, *Feste Haeseler*, etc., instead of Fort. The Sanitary *Detachments* are now Sanitary Companies (answering to British Bearer Companies).

* * *

HOLLAND.

A National Defence Union was formed in 1900, which already numbers 13,000 members and has 85 branches. Its object is to promote the universal practice of rifle shooting and gymnastics, in view to the defence of the country, should it be invaded or drawn into war. The War Minister has given the members opportunities for using the rifle ranges of the troops in or near the garrisons.

Rifle practices are to be carried on weekly from May to August, and all young men from the age of 16 to 24 can take part in them, besides, of course, the Reservists and Militia men on presentation of a certificate that they have undergone the necessary preliminary instruction. No more than 15 rounds are to be fired by any man in one day.

The War Minister has made a grant in aid of 10,000 gulden (£834) in this year's Budget. The men pay for the ammunition, and the Union defrays the expenses of the service.

Short range Morris tube, or similar ranges, are also being established.

ITALY.

No changes are reported in the organisation of this Army.

On 1st April, 1899, the total "rationed" strength was as under:—

Officers and Men.

Standing Army {	with the colours	254,078
	on furlough	503,857
Active Militia		304,587
Territorial Militia		2,106,239
		—
Total		3,168,761

As reported last year, the Standing Army was increased by 10,000 men.

At the end of January, 1900, Captain Carrara's military cycle was finally approved for the Service. 2 Cyclist Companies took part in the Cavalry Manceuvres.

Officers of Engineers have been sent to Paris to study automobiles, and further trials with these will be made next year. The Alpine troops.—Numerous experiments were made with war balloons and homing pigeons. The photogrammetrical plans made were successful. Between Etna, Sicily, and Malta an optical telegraph has been established. This works well. The distance is 191 miles. The forts, etc., of the Straits of Messina have been connected telegraphically on the wireless system.

* * *

JAPAN (From 1898 to 1900 inclusive.)

When the re-organisation of the Japanese Army is completed in accordance with the Imperial decree of 1896 it will consist of 13 Infantry Divisions, 2 Cavalry Brigades, 2 Field Artillery Brigades, 17 Battalions Siege and Garrison Artillery and 1 Railway Battalion, 13 Engineer Battalions. Altogether 156 Infantry Battalions, 51 Squadrons, 114 Batteries, 13 Engineer Battalions, 13 Train Battalions, 17 Garrison Artillery Battalions, and 1 Railway Battalion on a peace footing.

In war the following units are mobilised in addition:—

52 Infantry Battalions, 17 Squadrons, 19 Batteries, 13 Companies Field Engineers, 13 Companies Train from Reserves. 104 Infantry Battalions, 34 Squadrons, 76 Batteries, 26 Companies Field Engineers, 26 Companies Train from Territorial Troops and Militia.

The total war strength would then be:—

Active Army, about	228,500
Reserve	33,300
Territorial	125,600
	—

Total 387,400

Of these, 250,000 were available in December, 1899, for foreign active service.

Composition of an Infantry Division.	2 Brigades=2 Regiments=6 Battalions	Combatant Troops.
	1 Regiment Cavalry=3 Squadrons	
	1 Field Artillery Regiment=2 Brigade Divi- sions=6 Batteries of 6 guns	
	1 Battalion Engineers=3 Field Companies with a bridge train	
	6 Ammunition Columns=4 Infantry, 2 Artil- lery	
	1 Bearer Company	
	6 Field Hospitals	
	1 Supply Column	
	1 Battalion Train	
	1 Telegraph Detachment	
		Non-com- batants.

An Infantry Company=217 rifles, 1 Squadron=120 horses, 1 Bat-
tery=6 guns 150 men, 1 Field Company Engineers=220 men. Total
strength about 14,000 men. The Imperial Guard and the 1st Division
have each a Cavalry and an Artillery Brigade. It is intended to com-
plete 12 Infantry Divisions.

Recruiting and filling up the cadres are carried out on the German
system, which has answered well.

There is a Major-General as Chief of the Staff, and the Divisional
Staff is organised as in European Armies. The Divisional Commander
is usually a Lieut.-General.

In Formosa about 9,000 men are stationed. They are in 3 mixed
Brigades of 3 or 4 Battalions, 1 Squadron, and 1 Battery Artillery each.

Mobilisation.—In the China War 5 Divisions mobilised in 17 days,
each Division consisting of 13,000 combatants and 8,000 non-combatants.

Rifle practice is carried on throughout the year as follows:—From
January to May once or twice a week; from June to December field-
firing once or twice a month. Company Commanders are responsible
for the shooting.

The Cavalry is inferior to the Infantry and deficient in knowledge of
the use of ground.

In the spring of 1900 new Field Service Regulations were issued,
which are, in fact, copied from the German Field Service Regulations of
1894. Careful instructions for embarkations and disembarkations are
added.

In 1899 the Autumn Divisional Manceuvres of the 1st Division were
preceded by embarkation practice, a mixed Brigade embarking at Yoko-
hama and being conveyed to Tatayama 40 miles off.

The discipline of officers and men is excellent, and the troops upheld
in the late Boxer difficulties in China the reputation they had gained in
the previous war with that Power.

RUSSIA.

Owing to the China complications, progress in the European forces
of Russia as regards new formations, etc., has been slower than usual.
The Russian forces are kept on different establishments according to the
local requirements. There is the ordinary peace establishment for home

stations, the higher peace establishment for frontier troops, and the war establishment. This latter is generally maintained by the greater part of the troops in Asiatic Russia.

According to a trustworthy account, the following was an approximate summary of the total peace strength in 1900:—

In European Russia and the Caucasus.

	Infantry.	Cavalry.	Artillery.	Engineers.	Train and other Services.	Total.
Field Artillery	510,000	110,000	82,000	29,000	—	731,000
Reserves	64,000	400	9,000	1,000	—	74,400
Fortress Garrisons	39,000	—	38,000	4,000	—	81,000
Ersatz (2nd Res.)	—	5,700	2,800	—	—	8,500
Local Troops	14,000	400	6,000	200	34,000	54,600
Grand Total	627,000	116,500	137,800	34,200	34,000	949,500

In Asiatic Russia.

Field Army	57,000	14,000	9,000	7,000	—	87,000
Reserves	12,000	—	300	—	—	12,300
Fortress Garrisons	4,000	—	5,000	600	—	9,600
Local Troops	10,000	—	200	—	5,000	15,200
	83,000	14,000	14,500	7,600	5,000	124,100

* * *

The following are the ages at which commanding officers on the active list must compulsorily retire:—

Cavalry Regiments	56
Infantry	58
Brigade or District Commander	60
Divisional Commander	63
Corps Commander	67

Many retirements took place in 1900 in consequence.

Efforts are being made to increase and improve the Staff College, the War Schools, and the Cadet Corps, in view of the many vacancies regularly occurring.

A curriculum for Lecturers and Instructors has been laid down. The course lasts 9 months.

The Grand Duke Constantin Constantinowitch has been appointed Director-General of Military Education.

Mobilisation.—The untoward events in China found the Russian Troops in Eastern Asia in a state of transition, as their re-organisation was being proceeded with. The occurrences in Peking in May, 1900, necessitated immediate reinforcements of the few Russian troops in China. 4,000 were sent. By the end of July there were available 16 Battalions, 38 guns, 6 Sotnias Cavalry, 2 Sapper and 2½ Railway Com-

panies of Engineers. In June the troops of the Amur District and some Cossack Regiments were hastily mobilised, and meanwhile the troops first to hand were hurried forward to oppose the attacks of the Chinese in Manchuria. Three European Brigades of Rifles with their Artillery were called up to the support of the Russians in Eastern Asia. The 4th Siberian Corps furnished reinforcements to the troops in the Far East in July. The main line of the Manchuria Railway, upon which the Chinese hordes had made constant raids, and had broken up in parts, was again in Russian hands by the 2nd September, 1900.

Altogether about 173,000 men, inclusive of the garrisons and the European reinforcements, were eventually assembled on the theatre of war in Eastern Asia.

In October, owing to the great expense of keeping up so large a force, demobilisation began, and the force is being gradually reduced to a peace footing, the European reinforcements being gradually retransported to their proper garrisons.

Though on the whole the mobilisation and reinforcement of the Russian Army in Eastern Asia was a success, several defects in the mobilisation machinery were discovered, which will have to be remedied.

Manœuvres.—The usual Summer and Autumn Manœuvres were held, and the Report details these.

The issue of the new Drill and Tactical Regulations has made continuous progress. The "Instructions for the Combat," a recent issue, is a sort of Tactical Handbook for all arms. It has been tried at manœuvres, and does not meet with universal approval. It is being modified by a committee.

The Felddienst, "Instructions for Field Service," dates from 1899. The most complete account of the Russian Army, its organisation, etc., is to be found in the work by Colonel Gulewitsch, of the Imperial Staff College, *The Armed Strength of Russia*, 3rd Edition, 1900, which is being translated into German; also the shorter *Russia's Military Strength, according to the most recent Official Information*, Lemberg, 1900.

The question of remounts is gone into, the chief feature of which is the abolition of the middleman in purchases.

At the Great Cavalry Manœuvres at Lorza in August, the South Cavalry crossed the Pljussa river by swimming, and then made a general attack upon that of the North while it defended the bridge with dismounted Dragoons and Horse Artillery. It was adjudged the victory.

FIELD ARTILLERY TACTICS.

General Remarks.—Though France and Germany have adopted Q. F. field guns and other Armies have made improvements in their Field Artillery, they have not yet come into general use. One thing is certain, that guns, howitzers, or field mortars delivering high-angle fire, are indispensable to a Field Army. The South African War has confirmed the necessity for this, which was foreshadowed in previous Reports.

The German Field Artillery has done well to retain common as well as shrapnel shell for use with its Field Batteries. The Report goes into technical details, covering several pages on this subject, which our space does not admit of following.

When massing guns against a strong defensive position, the distance should first be found by trial shots of a single battery, before the whole line of guns opens fire simultaneously on the intended point or points of assault. This will not betray these points to the enemy prematurely. Direct fire is the risk. When the country or the conditions of the fight make a concealed position necessary, then indirect fire is used.

The days of trial shots as range-finders are past. France, Great Britain, and Italy all use range-finders, and Austria is experimenting with one.

Artillery must, however, pay much greater attention than heretofore to careful, thorough *reconnaissance* of the enemy's position and of the ground in front, if full advantage is to be taken of these.

England.—The tactical principles of the British Field Artillery are in accord with those of the chief European Armies.

Massing of guns and fire, unity of control, fire effect, cover and mutual support of Infantry and Artillery, are maxims which characterise English Artillery Drill. The necessity for the use of field howitzers against entrenchments was recognised, and these were supplied. Yet at Magersfontein, Colenso, Spion Kop, Vaal Kranz, the British Artillery failed to overwhelm the Boer guns so as to make the assault of their positions easy. This was because these guns did not attempt an artillery duel with the British guns, but withdrew them for the Infantry assault or awaited favourable opportunities, such as when the British guns were changing position, etc., to fire on the latter.

Effectual reconnoitring of the Boer positions was much hindered by the extraordinary nature of the country, by the perfection of the defensive arrangements of the Boers, and by the skill with which their entrenchments were laid out and concealed. It is at the same time impossible to acquit the British of want of thoroughness in their *reconnaissance*, which led them to neglect pushing scouts forward closer to the enemy's entrenched positions. It was impossible to judge of the Boer positions and dispositions from distant observation, as they kept their men so well concealed and withheld their fire.

In such cases no amount of self sacrifice and valour (which the British Artillery certainly displayed) could avail.

Had the British had a well-organised system of scouting, they would have been spared many a disaster. Notably at Magersfontein and Colenso they mistook the actual Boer positions, thinking they were just below the crests of the kopjes, whereas they were in reality at the foot of those in advanced positions.

The fire effect of the lyddite shells was, by Boer accounts, far less than that expected. It failed in depth, and only was destructive in a

limited radius, even when the shells exploded immediately on impact.

The shrapnel of the field guns was also less effective than was expected from the reports of the Soudan War. That was because its target was not so easy, and that instead of the range being about 3,000 yards or under, it had to be much greater, owing to the Boer long-range position guns, and for this the fuzes were not adapted. Therefore, the terminal velocity of the bullets was too slight to be effective. Another reason was, that the Boer trenches were zig-zagged in trace and well traversed, so that even the enfilading effect of the shrapnel was much minimised. It was not so much the fault of the British field guns, however, as of the training of officers and men, who failed to understand their proper use. The Artillery had only been practised in field firing in small detachments. Such a thing as *continued* mutual action on a large scale habituating the two arms to work together and engendering mutual confidence in leaders and men, which we in Germany consider indispensable to success in war, is unknown in England.

The invariable practice of the British to keep back their Infantry until the Artillery action is over was noted by the Boers, who kept quietly hidden in their deep trenches, well provided with splinter-proofs, until the artillery bombardment was over, reserving their whole energies for the Infantry attack. Had the British, as the German Regulations now recommend, pushed forward their Infantry *simultaneously* with the artillery bombardment to reconnoitre and draw the defenders' fire, the Boers would have had to man their trenches, and would have suffered proportionately greater loss. Even when the howitzers came into play and the enemy's position was well known, these were not very effectual.

The Field Artillery neglected no opportunity of supporting the Infantry at close range, but their field gun is rather a heavy one, and it was not always possible for these to follow the Infantry quickly over the rough country. It is impossible to give a detailed account of the Artillery in their many engagements in South Africa. A striking criticism of the Artillery action is to be found in von Hoffbauer's "Development of the Mass Action of Guns in the Prussian Army."

France.—At the beginning of the year 1900 three important Artillery questions were awaiting decision :—

1. Was the Corps Artillery to be retained, or, as in Germany, to be distributed among the Divisions?
2. The number of guns required for an Army Corps.
3. The question of 4 or 6 field guns in a battery.

The first question has been much discussed, and is not yet decided, but the tendency seems to be towards the German system, and that the Artillery Generals are willing to give up special artillery interests to the general good, on the understanding that Divisional Generals are practised as frequently as possible in the conduct of artillery in combination with the other arms.

At the autumn manœuvres last year, however, the existing organisation was retained.

The second question has also been much discussed, the outcome being that for the present 120 guns per Army Corps are required.

The third question has at last been decided in favour of four-gun field batteries, but that 11 to 12 ammunition wagons are necessary for each battery.

As regards steel shields to be carried on the field guns, opinion in France is much divided. It is said that but little protection is afforded by them for the extra weight carried, and that it is difficult to conceal the position of guns carrying them.

The French Artillery officers are apparently of opinion that bold forward action is of more importance than concealment.

Excepting in certain cases where the Artillery was kept too far back before coming into action, or was thrust into the fight in too desultory a manner, or where it changed position too frequently, the French Artillery at the manœuvres was well handled. Its mass action and the concentration of fire on decisive points were much praised.

The disposition of the ammunition wagons in the line seems inconvenient as regards replenishment of ammunition, and dangerous under the fire of Q. F. field guns.

It must be remarked, however, that, owing to the extreme secrecy observed in France in regard to artillery matters, it is very difficult to get reliable information as regards this arm in that country.

Germany.—The new organisation of the Artillery has been carried out as foreshadowed in last year's Report.

The regulations for marches are in accordance with this. The commander of a force determines whether Field Artillery is to be attached to the Advanced Guard, and if so in what strength. Field Artillery is to be as near the head of the main columns as its early employment in the fight necessitates and considerations for its safety admit of.

With Rear Guards the action of artillery from flanking positions is recommended as facilitating the retirement.

Great stress is laid on care in replacing expended gun ammunition. After every action report is to be made to the commander as to whether this has been done.

In manœuvres great attention is paid to accurate judging distance. As fire effect cannot be well judged of, this is taken into consideration by the umpires.

General officers and colonels of Infantry and Cavalry chosen for the purpose yearly are to attend the Artillery winter courses.

Russia.—The discussions mentioned in last year's Report, regarding the reduction of the 8 guns in the Field Batteries to 6 have led as yet to no change being made.

The regulations for Attack and Defence are similar to those in the German Artillery Drill, but while the latter recommends the line of

batteries at half or close interval when acting in masses, in order to allow of other batteries arriving on the field coming into action without mixing up the units, the Russians recommend keeping the batteries in line at full interval.

In attack, as soon as the point of attack is indicated, the guns take position to a flank. In attack officers are to be sent forward to make outline sketches of the enemy's position, before the guns take up their ground. On the defensive the construction of gun-pits is the rule.

In the Horse Artillery fight, supporting cavalry, the two batteries are to act together, not separately.

In attacking Infantry, the Cavalry must manœuvre so as to hamper the Horse Artillery as little as possible in its action.

The Russian Artillery is not guided by the new "Instructions for the Troops in Battle," in which stress is again laid on the necessity of working by masses.

Up to within effective Infantry range that arm is to be guided as to its positions by the requirements of the Artillery. From that onwards the Artillery is to choose its positions with reference to those of the Infantry. Artillery changes of position under 1 verst (1,167 yards) are, however, to be avoided.

Batteries going forward to support Infantry are to move immediately behind them and move up with the position with them.

At manœuvres a certain time is always allowed for the preparation of the attack by Artillery. This seems to work well.

ARTILLERY MATÉRIEL IN 1900.

General.—In most States the provision of a Q. F. field gun which answers reasonable requirements is still a matter under discussion. Great stress is laid upon the number of rounds that can be fired in a minute. This is a factor to be considered, when people speak of 8, 10, 15, 20 rounds in a minute, which would soon lead to firing away all the available ammunition too soon. The mechanical perfection of the loading method, and the higher training of the men so that greater skill in quick loading may be obtained, is what is to be looked for; but with short service and Militia Artillery, this is very difficult to ensure.

It is demanded that the gun shall be concealed as much as possible. To do this the piece when unlimbered must be run up by hand. This necessitates a lighter gun. Formerly it was considered sufficient to conceal the gun in the folds of the ground. Now, owing to the increasing accuracy of gun and rifle long-range fire, this is insufficient. The French are carrying steel shields. Whether the protection they afford makes up for the extra weight carried and their increased visibility is a moot point. The great increase of muzzle velocity lately considered so desirable seems now to be less regarded.

The introduction of Q.F. guns for Fortress and Siege Artillery seems to have made little progress. In Austria, they have done more in this

way than in other States. Machine guns long since used for fortress are now in general use in the field.

Austria-Hungary.—Little has been done in regard to the Q.F. field gun question. Some Coast and other Fortress Batteries have been re-armed and attention has been paid to Q. F. field guns and mortars for these.

Belgium.—The report gives some details of the New Belgian John Cockerill Q.F. heavy and light guns, which it says do not as yet justify the expectations formed of them in Belgium. Their rate of fire is about 10 to 12 shots per minute. Further details are given in the *Kriegstechnische Zeitschrift*, for January, 1901.

England.—There is no law in Germany forbidding the export of war material by private firms, and England was able to purchase from the *Rheinische Metallwaren- und Maschinen-Fabrik*, of which Herr Heinrich Ehrhardt is the chief constructor, 18 batteries of 6 guns, 9 ammunition and 3 provision wagons. These were delivered five months after the contract was signed. We understand that the Government has expressed a wish that no further supply of guns shall be made. The purchase was made in Germany, because the British firms, of which only two, viz., Vickers, Sons & Maxim, and Armstrong, Whitworth & Co., are capable of turning out good war material, were so slow in their delivery. The Woolwich Arsenal was another source. In 1899, the Government had already ordered from each of the above-named factories a battery in view to the introduction into the British Service of a Q.F. field gun of entirely new pattern. The C.I.V. Corps took out a 7.5 centimetre (2.95 inch) Maxim-Nordenfeldt (Vickers-Maxim) Q.F. Battery, the guns being of old pattern. A battery was offered to, and accepted by, the Government by Armstrong's factory, which was originally intended for the Elswick Volunteers.*

The Report gives further details concerning Sir George Clarke's Q.F. spade arrangement for our field guns.

It says that the effect of the lyddite shells was not so great as was expected. That in soft ground or against newly thrown up earthworks they were quite ineffectual, though the larger shells worked with good results against brick or stone.

France.—The Report speaks of the impression made on all foreign military officers by the French Q.F. field guns at the Manceuvres in La Beauce, in 1900. It quotes the description of these guns given by the *Times* Correspondent in that paper of the 22nd September, 1900, and says that a new departure has certainly been made.

The weight of the shell is about 14 lbs., the muzzle velocity about 1,800 foot-seconds. Details are given in the 4th and 5th Vols. of *Kriegstechnische Zeitschrift* for 1900.

Germany.—The details of the Light Field Howitzer are as under: calibre 10.5 centimetres (4.134 inches), length about 12 calibres (4 feet

* These were 12-pounders of the 12 cwt. pattern. — TRANSLATOR.

1.6 inches), weight of piece 496 kilogrammes (13.65 cwt.). The breech is on the quick-loading "Keil" or "Leitwell" system by Krupp, of Essen. Total weight about 21.5 cwt.

The Report on these gives further details, which want of space forbids our transcribing. The common shell weighs about 34½ lbs., the shrapnel carries 500 bullets of 10 grammes (.35 oz.) weight. Time and percussion fuzes are used with each up to about 5,600 metres (6,121 yards) range.

The 15-centimetre (5.9-inch) heavy Howitzer is removed to the heavy position batteries.

Two batteries of Krupp mountain guns are in China.

Japan.—Japan has been experimenting in the direction of Q.F. field guns ever since the Chinese War.

A large amount of matériel has been ordered from Krupp, which can be put together in Japan, where they desire to support home industries. 100 mountain guns were ordered from the Schneider-Canet firm, but have not been delivered. It is thought the Russian Government may have had something to do with the delay.

Portugal.—The Horse Artillery has been armed with 2.9-inch Krupp Q.F. field guns. The Field Artillery still have the 8-centimetre field guns.

Russia.—Lieut.-General Engelhardt, the Chief Constructor, lays great stress on a good rate of fire. For this great steadiness of the gun is necessary. He also demands great muzzle velocity up to nearly 2,000 foot-seconds. 1,000 of his guns have been ordered, but the Government has not finally decided in favour of his system. Should guns of an improved kind be adopted later, these will be made use of in Central Asia, etc., to replace the other patterns now there. The rate of fire attained is about 10 rounds per minute.

Detailed tables are given in the Report (p. 382) comparing the Russian light field gun M/95 with the German field gun M/96, and the Russian field mortar M/91 of 15.25 centimetres with the German light field howitzer of 10.5 centimetres.

In 1900 machine guns (Maxims) were given to the 3 Siberian Army Corps.

Sweden.—The Krupp 7.5 centimetre (2.95-inch) Q.F. field gun has been tried, and it is believed successfully, though the details have not been published.

The 6.6-millimetre Hotchkiss machine gun of the Swedish pattern has been recommended by the Ordnance Experiments Committee for adoption, its advantages over the Maxim and Nordenfeldt machine guns being:—

1. Simplicity of construction and repair.
2. Easy recognition of any failure to work properly.
3. Absence of necessity for a water-cooling jacket, so that its presence is not betrayed by the steam.

4. Not so easily injured by damp or dust.
5. Not so easily put out of gear by torn cartridge cases.
6. Cartridge cases less liable to burst.

Turkey.—As the result of recent trials, a contract is being made with Krupp, of Essen, to furnish 16 Q.F. field gun batteries of 6 guns each. The Ehrhardt shrapnel shells, which were tried in 1899, did not give quite satisfactory results, owing to the excessive scattering of bullets. The Krupp shells stood the firing tests better, and the time and percussion shells of the other firm did not stand the endurance tests so well.

SMALL ARMS, 1900.

General.—By the experiences of the South African and China campaigns the calibre question has made considerable progress.

In South Africa the 7-millimetre (.276-inch) and 7.7-millimetre (.303-inch) were opposed to one another, and in China from 6-millimetre (.236-inch) to 8-millimetre (.315-inch) were used. Our opinion is in favour of a calibre between 7-millimetre and 8-millimetre. 6.5-millimetre (.256-inch) should certainly be the smallest for practical purposes.

The Mauser self-loading pistols seem to have answered well in war.

PROGRESS IN ARMAMENT OF INDIVIDUAL STATES.

Germany.—All new inventions and improvements in military weapons are tried in Germany.

The new rifle M/98 was served out to the Marines and other troops sent to China. Then the Infantry of the Guard Corps received it. The Line regiments will be gradually armed with it. Only a small number of these rifles are to be manufactured by private firms in Germany, such as Mauser in Oberndorf. Foreign firms are excluded.

The sighting of this rifle is for 200, 300, 400, 450, and for every 50 metres from that to 2,000 metres. It is called the Langesche sighting.

The rifle is 4.1 feet long, bayonet 2 feet 1 $\frac{1}{4}$ inches long; weight without bayonet, 8 lbs. 15 ozs., with, 9 lbs. 14 ozs.; weight of 5 rounds 5 $\frac{1}{4}$ ozs.; a cartridge box (for knapsack) with 15 rounds weighs 16 $\frac{1}{2}$ ozs.

An improvement on the Mauser pistol was tried in China, and gave satisfaction.

France.—The new Dandetean rifle has not yet been served out to the troops, though the experiments at the School of Musketry and at the Camp of Chalon were successful.

Holland.—The whole of the Infantry is now armed with the Mannlicher mark 1895, which has had a calibre of .236 inch; length, with bayonet, 5 feet 4 inches; weight without it, 8 lbs. 8 ozs. A Major Giel is said to have designed a good light rifle only 6 lbs. 8 ozs. in weight.

Norway.—By convention with Sweden the rifle ammunition manufactured in Norway was to be of the same calibre so as to fit the Swedish rifle, though it is of a different pattern from the Norwegian arm. The Norwegians are stated to have evaded this contract. Recent experi-

ments show that to resist penetration by small-bore rifle bullets 2 metres thickness of snow is required.

Portugal.—The Portuguese troops have been uniformly armed with the Mannlicher 6.5-millimetre rifle.

Russia.—The Militia are to retain the old Berdan till they are armed with the new three-lined 7.62-millimeter (.299-inch) rifle.

Sweden.—The Swedish Army will by the end of 1900 have only 95,000 Mauser rifles, 6.5-millimetre, out of the 200,000 for which the money was voted in 1896.

Switzerland.—The short rifle M. 89/1900 has been ordered to be supplied to position artillery, fortress troops, telegraph and balloon companies and cyclists, and this is being gradually effected.

Trials with different kinds of "self-loader" pistols and revolvers have been made since 1897. The results are:—1. Borchardt-Lueger. 2. Roth. 3. Mannlicher. 4. Bergmann. 5. Mauser. The final result of later trials is that the Borchardt-Lueger has been recommended. This has a calibre of 7.65 millimetres (.301-inch); length of barrel, 4.72 inches; total length, 9.33 inches; weight with magazine, 2 lbs., which carries 8 cartridges, each weighing 1.4 oz.

MILITARY APPLIANCES.

The Report notices the new military appliances discovered or tried during the year. At the French manoeuvres a new lighthouse car was in use. This was a motor-car with two seats (one for the driver and the other for a staff officer), carrying its own accumulators, and a lightly-built pillar throwing the electric light, which is generated by a dynamo of 7-H.P., a distance, it is said, of 2 miles. A new range-finder by Carl Zeiss, of Jena, is described, and the photo-stereo binocular of Goerz and that of Triedner are mentioned. These and other binocular range-finders are more fully described in the *Kriegstechnische Zeitschrift*. Vol. III., of 1900.

An Infantry range-finder, by Major von Zidlitz, was tried at the School of Musketry at Spandau, and met with approval. Each company is to be supplied with that or a similar one.

The Russians are making great efforts to supply their troops with aluminium camp kettles, water-bottles, mugs, etc.

Magnalium is a combination of magnesium with aluminium, which has been invented by Dr. L. Mach. It is lighter than aluminium, and free from the defects of the latter. All cooking and other utensils can be made of it, and cartridge cases, helmet ornaments, buttons, and other articles of equipment, as well as carriage and wagon fittings, can be made of it.

A shield to protect riflemen, invented by Dr. Biles, an Englishman, is said to have been tried by Cammell & Co. It is about $\frac{1}{3}$ inch thick, a little over 1 square foot in size, and has a loophole in it to fire through. It weighs about 7 lbs.

The two English steam ploughs for furrowing up shelter trenches, which were despatched to South Africa, were lost at sea.

Several new kinds of preserved meat and vegetables have been tried.

A steering-balloon with an aluminium car, invented by David Schwarz, was tried with promising results; but the inventor died, and funds were not forthcoming for further experiments.

Count Zeppelin's air-ship is considered epoch-marking as regards progress in the steering-balloon question. The cost of this also has, however, hitherto proved an insurmountable objection. Great progress has been made in the application of motor wagons to military transport.

At the German manoeuvres in 1900 the American "Stanley" or French "Serpelot" motor, driven by petroleum, was tried. It is on the tubular system, and works with little noise.

These are of great use for general and staff officers, as sparing them the fatigue in being always on horseback and facilitating their work. Cyclist escorts can accompany them.

In France great attention has been paid to military motor-cars, as motors are in more common use there than in Germany. These are chiefly driven by petroline gas ignited by electricity.

The Mors Co. has brought out a four-seated open car for corps commanders and their staff, which can be easily driven at a rate of 36 miles per hour, and has attained a speed of 50 miles an hour on the flat. It weighs $27\frac{1}{2}$ cwt. Another was tried at the manoeuvres in the east of France in May which can ascend steep gradients. The body is of aluminium. The Purzot covered wagon was tried and attained easily a speed of 12 miles an hour. A "Scotte" steam-power motor is said to have drawn a weight of 3,000 tons of war matériel over 1,800 miles up and down gradients, amounting in some cases to $\frac{1}{10}$ (6°).*

The English used traction engines for transport in the Boer War. In all the principal European Armies experiments are being carried on with motor wagons, cars, and carriages, for:

1. The transport of wounded and sick.
2. Field telegraph and postal wagons and other field-message use.
3. For the transport of ammunition and food.
4. For gun transport.
5. In fortress warfare.

As regards armour-plating, the Report states that 15 centimetres (5.9 inches) of Krupp's hardened steel are equal in resisting power to 25 centimetres (9.8 inches) of Harveyized steel, and that the German men-of-war of the "Kaiser" type are equal to any war-ships in the world in offensive and defensive power, and that no nation has ever made such progress in ship-building as Germany in recent years.

The Report states that German naval opinion is not favourable to submarine boats for various technical reasons, and that money outlaid

* As these motor-cars travel at an average rate of 25 miles an hour or more, professional cyclists would be required to scout ahead of them.—TRANSLATOR.

on such dangerous weapons of offence would be better spent on the construction of efficient modern torpedo-boats.

Medical Services.—The section of the Report which deals with the Medical Services concerns itself chiefly with the Volunteer and Red Cross Societies of different nations, and those organised in Germany naturally take the first place. It was thanks to their practical and long-tried organisation and experience that the first German Field Hospital was able shortly after the outbreak of the Boer War to take its place in November, 1899, with that of Holland behind the fighting forces of the Burgher Army. A second followed in December, a third left Naples in March, 1900, for Lorenzo Marques.

By the middle of March, a Station Hospital of 75 beds was established in the Orange Free State. The German Field Hospital had been so well organised and worked at Paardeberg, that it drew forth from Lord Roberts a warm encomium on its excellent arrangements and the zeal and impartiality with which its staff of doctors, nurses, and attendants alleviated the sufferings of the wounded of both sides.

The French nation sent 4 Field Hospitals, 2 for the Boers and 2 for the British Forces, it being the strict condition of their humane mission that aid was to be afforded impartially to both belligerents.

From England, thanks to the liberality of its citizens in all parts of the country, the Princess of Wales was enabled to fit out a Hospital Ship as a reserve to the General Hospitals. The St. John's Ambulance Association gave much assistance by their reserve of surgeons and trained attendants, and the reserve of Army nursing-sisters sent out 40 nurses for distribution among the several Field Hospitals. Hospital Trains were organised, of which two were sent to Natal.*

A PILGRIMAGE TO THERMOPYLAE.

(From the *Independent*.)

THE next day we took Thermopylae at our leisure, passing out from Lamia over to Spercheios on the bridge of Alamona, at which Diakos, famous in ballad, resisted with a small band a Turkish army, until he was at last captured and taken to Lamia to be impaled. Luckily this one bridge over the Spercheios remains, and Thessaly has a road open to the east through Thermopylae and Atalante. The day was perfect, a day to make an old man young. We were like boys at play, in spite of the overpowering associations of the place. We sat down in the sunlight and dabbled with our feet in the hot sulphur stream, which has given its name to the place, Thermopylae meaning "Hot Gates."

* It is strange that no mention is made of the English Red Cross Society, so long established, and so ably presided over by the late Lord Wantage, V. C.—TRANSLATOR.

It may be taken as a well known fact that the Spercheios has since the time of Herodotus made so large an alluvial deposit around its mouth that if he himself should return to earth he would hardly recognize the spot which he has described so minutely. The western horn, which in his time came down so near to the gulf as to leave space for a single carriage road only, is now separated from it by more than a mile of plain. Each visit to Thermopylae has, however, deepened my conviction that Herodotus exaggerated the impregnability of this pass. The mountain spur which formed it did not rise so abruptly from the sea as to form an impassable barrier to the advance of a determined antagonist. It is of course difficult ground to operate on, but certainly not impossible.

The other narrow place, nearly two miles to the east of this, is still more open, a fact that is to be emphasized, because many topographers, including Colonel Leake, hold that the battle actually took place there, as the great battle between the Romans and Antiochos certainly did. This eastern pass is no place where "a thousand may well be stopped by three," and there cannot have taken place any great transformation here since classical times, inasmuch as this region is practically out of reach of the Spercheios, and the deposit from the hot sulphur streams which has so broadened the theatre-shaped area inclosed by the two horns can hardly have contributed to changing the shape of the eastern horn itself. Artificial fortification was always needed here, but it is very uncertain whether any of the stones that still remain can be claimed as parts of such fortification. It is a fine position for an inferior force to choose for defence against a superior one, but while it cannot be declared with absolute certainty that this is not the place where the fighting took place, yet the western pass fits better the description of Herodotus. Besides this, if the western pass had been abandoned to the Persians at the outset the fact would have been worth mentioning.

As to the heroic deed itself, the view that Leonidas threw away his own life and that of the 4,000, that it was magnificent but not strategy, not war, does not take into account the fact that Sparta had for nearly half a century been looked to as the military leader of Greece. It was audacious in the Athenians to fight the battle of Marathon without them, and they did so only because the Spartans did not come at their call. Sparta had not come to Thermopylae in force, it is true; but her king was there with 300 of her best men. Only by staying and fighting could he show that Sparta held by right the place she had won. It had to be done. "So the glory of Sparta was not blotted out." Had Sparta shown the white feather here, and a retreat would have been interpreted as showing the white feather, she would have lost prestige with the rest of the Greeks; and in that case it is as good as certain that Plataea would never have been fought.

But besides showing the high statecraft which the occasion demanded, Leonidas was performing the simple duty of obedience to Spartan law,

not to retreat before an enemy. He had been sent to hold the post ; and he stayed to the end ; and there is no more stirring clarion note in all that high-pitched story of the Persian war in Herodotus than the epitaph inscribed on the monument to the fallen Spartans, "Stranger, tell the Lacedemonians that we lie here in obedience to their laws." Whether Simonides felt the need of simplicity and brevity, or whether Spartan taste prescribed it, it is at any rate most fitting that boasting is omitted. The deed was so great that one little note of brag, or even some little amplifying and embellishing, would have belittled it. It is stirring to read those other equally brief and equally simple lines of Simonides inscribed on the monument erected for the total number who fought and fell : "Four thousand from Peloponnesus fought here with three millions."

One may have read, and read often, the description of the battle in the school room, but he reads it with different eyes on the spot, when he can look up at the hillock crowned with a ruined cavalry barrack just inside the western pass and say to himself : "Here on this hill they fought their last fight and fell to the last man. Here once stood the monuments to Leonidas, to the 300 and to the 4,000."

The very monuments have crumbled to dust, but the great deed lives on. We rode back to Lamia under the spell of it. It was as if we had been in church and been held by a great preacher who knows how to touch the deepest chords of the heart. Euboea was already dark blue, while the sky above it was shaded from pink to purple. Tymphresos in the west was bathed in the light of the sun that had gone down behind it. The whole surrounding was most stirring, and there was ever sounding in our hearts that deep bass note, "What they did here." Even when we were afterward enjoying the great walls of the Acropolis of Pharsalos and the Vale of Tempe we kept thinking of Thermopylae.

THE BLOCKHOUSE IN SOUTH AFRICA.

(United Service Gazette.)

CAPTAIN R. A. F. KINGSCOTE, commanding the 57th Company, Royal Engineers, lectured last week at Devonport on "The Blockhouse and its Role in South Africa."

The lecturer, dealing with the various phases of the war, said that at the third phase the Boers were able to come and go at will, get into touch and avoid touch of our columns as it pleased them, and at one time our troops, despite all their exertions, appeared to be unable to make any headway. It was necessary to locate the enemy, and the system adopted was that of chains of blockhouses and defensive posts. The blockhouses were first of all established all along the railways. Their presence only rendered our long lines of communication secure against anything but temporary damage, but, acting like a line of sentries, it was

always known if a commando was to the north or south, east or west of a certain line. He could not cross unobserved; and this in itself was a great advantage. While the railways throughout the country were being safeguarded, the towns were rendered secure against onslaughts of the enemy. The construction of blockhouses along the railways and round the towns, etc., was the system in its purely defensive aspect. The next point was to decide on the supplementary lines of blockhouses. There were certain areas in the Transvaal and Orange River Colony more infested than others by Boer bands, and it was imperative to sweep them clear. The neighborhood of the large towns and mining centres required the same treatment. To effect this it was only necessary to surround the selected areas by lines of blockhouses taken across country, the ends of these lines abutting on to the blockhouse chains along the railways. Areas of varying size were thus completely enclosed. The number and position of the blockhouses depended on the line selected. Each blockhouse must command as extensive a view as possible. It must be within sight and close rifle fire of its neighbors on either flank, and if possible there should be no dead ground between any two adjacent blockhouses. Their distances apart varied from a quarter to one and a half miles. Each blockhouse was in telephonic communication with its neighbor, and consequently with headquarters. The intervals were protected by stout barbed wire fencing and entanglements, and were, of course, frequently patrolled. Lamp signals and rockets were used to give alarm by night. It was not possible for the cordon of blockhouses unassisted to prevent a determined body of the enemy from breaking through; but our intelligence was daily better, our extending lines of blockhouses had increased the areas under observation, and the Boer commando was now fairly accurately located. The enemy's intention to rush the line was known, and where the railway existed, the threatened section was rapidly reinforced by troops who occupied sheltered trenches or commanding positions in proximity to the blockhouse lines. If no railway existed, the troops were pushed forward by forced marches. The escape of a body of the enemy through a line of blockhouses was a difficult task by day, and by night it was infinitely more so. A few desperate men might get through, but if they did it was with the loss of their baggage, Cape carts, etc., and these they had not now the facilities for replacing. The process of enclosing areas in this manner went on apace, and day by day less and less of the open veldt remained in the undisputed occupation of the Boer. These lines of blockhouses which were thrown out from the main system assumed a practically offensive aspect. In some remarks on the influence of blockhouses on the strategy and tactics of the present campaign, the lecturer said that, as regards strategy, whereas up until a short time ago our mobile columns were helplessly toiling over unlimited areas in the vain hope of overtaking a speedier foe, who might for all they knew be in front or to either side, and who often appeared unex-

pectedly and unwelcomed in the rear, these same columns were now operating in well-patrolled enclosed areas whose bounds were carefully watched and strongly guarded. The existence and extension of the blockhouse lines was gradually and surely forcing the enemy into a corner, and if, through the medium of the system, the enemy could be continued to be located and forced to give battle on ground of our choosing, the blockhouse system had achieved an undisputed strategical triumph. With regard to the effect on tactics, it was evident that a British column, operating along an extended base consisting of impregnable blockhouses within close supporting distance of each other and of other chains, was placed at a great advantage to begin with. The British column was relieved of anxiety as to its communications and supplies, and, on the other hand, the enemy was at a corresponding disadvantage. The moral effect was immense, and moral effect was half the battle. The blockhouse system in South Africa was succeeding because two conditions essential to its success were fulfilled. The first was that the enemy had no artillery, and, in the second place, the country was open. He ventured to state that when the close of the war came, that much desired end would have been obtained mainly by the scientific use of sheet iron and barbed wire. Up to the present the blockhouses and their garrisons had proved more than equal to the occasion.

Colonel M. H. Goldie, R. E., agreed that the system of blockhouses was one suited to the circumstance of the present war, the enemy being now without artillery and the country being open; but he believed there would be very few cases in military history where its use would occur again.

Captain Ricketts, who has served in the present war, said he had put up about a hundred of the blockhouses. In the first place they had no idea that such a simple thing would be so effective and so easily supplied. They had no galvanised iron, timber, or screws, and had to get these from Delagoa Bay, and construct the blockhouses as best they could. Between the sheets $4\frac{1}{2}$ inches of shingle was found to be absolutely bullet-proof. He had known blockhouses isolated from each other and from headquarters between three and four miles distant, and with twelve men in each.

DE WET'S LATEST FEAT.

Lord Kitchener's cordon of blockhouses and barbed wire was fully tested recently but (according to London advices) failed to hold the elusive Boer leader.

The battle of Heilbron, Orange River Colony, raged from nine o'clock Friday (February 6) night until two o'clock on Saturday morning. Throughout the five hours a fearful ring of fire from rifles, cannon and pom-poms, swept along the British lines (from Louwspruit to Heilbron, southwest, to Lindley and Kroonstadt), in holding De Wet's Boers, who made repeated attempts to break out of the circle of troops. From various positions, behind rocks and dongas, the Boers kept up a vigor-

ous fusilade, hoping to find a weak spot in the line. Simultaneously, others charged, but again and again were the Boers repulsed, leaving dead, wounded and prisoners in the hands of the British.

At the outset of the preparations the Boers realized that the operations were not merely an ordinary "drive," but a movement threatening them with total annihilation, and General De Wet assembled his whole force and discussed the situation with the commanders, with the result that the Boers were split up into three forces. On Thursday night 500 Boers, headed by Van Collers, rushed a force of the Imperial Light Horse, yelling, "Storm, Burghers!" About one hundred Boers got through, but the remainder, encountering a tremendous fire, were turned back.

Friday night's conflict ebbed and swelled over an area of forty to fifty miles, in which the long hunted, harassed and desperate men endeavored to find outlets. The Boers at one spot got within thirty yards of the British firing line, but the barbed wire balked the burghers and forced them to retreat.

The firing never ceased. Aided by the electric searchlights, the British harrowed the surrounding territory with shrapnel shells and Maxim bullets. In the northern section the Boers made a most desperate effort to break through. Collecting a number of cattle, the Boers drove them down on the British lines. Bending low in their saddles, the Boers rode among the cattle, making it impossible to distinguish them in the darkness. The British pickets opened a terrible fire, and the Boers were everywhere met with a relentless hail of bullets.

A long line of flame crackling like burning wood, ran up and down the firing line, nearly thirty miles in length, as the armored trains flashed their searchlights over miles of country. The reports of the quick firing guns along the entrenched line and the booming of the field guns and pom-poms sounded very deep amid the sharp crackling of the musketry, while Heilbron Fort contributed to the universal din with the deep roar of its naval gun.

This lasted for some twenty minutes, when gradually the rattle died down until the crack of single shots was heard. Then all was again quiet.

Among the spoils of war, General De Wet was not numbered.

THE IDEAL SOLDIER.

(From the London Spectator.)

THE only answer to the question, "What is a soldier?" which gives the essential, the sine qua non quality is the answer, "A man who can kill other men with rifle-fire." A soldier is a rifleman. A man may be able to kill other men with rifle-fire, and not be a perfect, or a reasonably efficient, or even a useful soldier, but unless he can kill with the rifle, he is not a soldier at all. A man

may be a splendid marcher, he may be trained to take cover with extraordinary skill, he may be an expert at digging trenches, his drill may be perfect, his power of turning himself out smart and clean, and with all his belongings in the most perfect order may be miraculous, and yet if he cannot shoot with a rifle, he is no soldier. Imagine an army composed of men possessing all the qualities we have enumerated except the power of shooting, and then imagine another composed of men who could all kill with the rifle, but had only that gift. Both would be very bad armies, no doubt, but who would hesitate to declare that the riflemen were the soldiers, and the other army, though composed of very accomplished men, were without the thing which is essential to soldiers?

Needless to say, we do not insist that the true answer to the question, "What is a soldier?" is, "A man who can kill with a rifle," merely as a piece of dialectical analysis. We insist on the fact because unless and until people not merely admit the fact with their lips, but realize it, we shall never get a true reform of the army. Rifle-shooting must be the foundation-stone on which the army rests. On that foundation must be built up a superstructure which seems, and in a sense is, as important as the foundation, but we must always remember that though there can be no superstructure without a foundation, there can be a foundation without a superstructure. Having laid the foundation of rifle-shooting, and answered the question, "What is a soldier?" with the reply, "A rifleman," let us next ask and try to answer the question, "What is a fully qualified soldier?" So many things are necessary to make, we will not say the perfect soldier, but the soldier who shall be able to render his ability to use the rifle fully effective, that it is difficult to know which to name first. In our opinion, the most important quality that can be laid on the foundation of rifle-shooting is that of discipline—using the word in its widest sense. The rifleman must be not only willing, but able to give an instant, and what is more, an intelligent, obedience to the orders of those above him. He must obey, and he must also, if possible, seize the object of the order, and obey, not like a machine, but like a thinking man. He must, that is, not be hypnotized by formal drill into a mechanical obedience, but must give an obedience which is co-operative, and not merely passive.

Next to this moral essential, we should put for the modern soldier, the hunter and scout qualities—the ability to take cover, to watch the enemy and his movements, to see without being seen, and to take intelligent advantage of all means of protection from the enemy's fire while at the same time pressing his own advance. Next, the soldier should be able to use the spade, and be capable of rapidly constructing protective works, which, though effective, shall be almost invisible to the enemy. These are qualities for use in the fighting line. To get him into the fighting line the soldier must as far as possible be endowed with the gift of mobility. He must be good at marching, but he must also be able to make use of other forms of transport if, and when they

became available. A soldier must be able to ride a horse, should it be possible to provide him with that means of getting over the ground, and further, he must be able to look after his horse if he gets one. Again, he should be able to ride and mend a bicycle if fortune should enable his colonel to "commandeer" a thousand bicycles, and so turn a three days' march into a day's march. But though this disciplined rifleman, who can stalk, scout, and dig, and also ride either horse or bicycle if required, will already be of great use in war, he can no doubt be improved by the addition of certain other things—accomplishments rather than essentials, but none the less of importance.

If he is given a physical training which makes his frame and his muscles like those of an athlete, he will no doubt endure longer and shoot more steadily than if he has had no physical drill. Furthermore, if he is something of a gymnast, he will, if he is making a rapid advance on foot, be able to surmount obstacles with much greater ease. It will clearly, for example, be good for him to be a swimmer. Again, if he has learned the handling of a bayonet, his enemy will fear the chance that he may get to close quarters more than if the same enemy knows that he has no skill with the bayonet. Lastly, if the soldier happens to be an expert at drill in close formation, he and ten thousand men like him may be able to get through the narrow streets of a great city more quickly and with far less confusion than if it has no practice at moving in close order.

THE RIFLEMAN.

A CORRESPONDENT of the *N. Y. Sun* treats the subject of rifle practice and fire discipline as follows:

"In President Roosevelt's message occurs this passage: 'Nowadays the most valuable fighting man and the most difficult to perfect is the rifleman.' The modern rifle and its perfect aiming are the central facts in war, are the pivot on which nations, if not civilization, must rise or fall.

"A man may practise with a Mauser until he becomes a perfect long range shot, and yet in battle might not be able to hit a barn. There are whole nations that might be practised and practised with the new gun; practised until perfect, practised until they could beat a Boer at long range targets; yet in battle one Boer might with little danger kill several such fine marksmen; for there is a whole lot of strange hidden things—things of the brain, heart and eye mixed up with the use of the new rifle in battle.

"Firing under fire to-day is a great big study of mind and body with far many things besides a gun and plain target shooting in the business. Watch dogs fighting. Their eyes look like black balls, the pupils as big as they can be from excitement. When the pupils are in this fix neither men nor dogs see well. All is confused and blurred. In the emotion of fear the same thing happens, only far worse. Is it not plain

that a man in this condition cannot hit another man a mile off with one of these new-fangled guns? Even a big bet will knock the aim sky high for most men.

"An Indian in ambush is the most dangerous of all marksmen, but in the open, his brain, heart, eyes, all get out of kelter. In plain fist and skull, or with the blunderbuss at twenty feet, it does not make so much difference about this eye, brain and nerve balance. But the long range small bore is a far harder test of nerve than even cold steel, the sword, is. Therefore it seems there is only one people, or those having this people's blood in them, that can take perfect aim under its deadly hail.

"But if the white man's eyes are injured by only using them at short range in houses, streets and books, instead of being developed by long range, by plain or ocean, by green woods and by horizon, then such may be little better than the heathen when it comes to fighting with the far-reacher. British and Boer show this plainly enough. Buller claimed that a Boer could see an Englishman twice as far as an Englishman could see a Boer. This muzzling of half the city children in spectacles is a bad business. Spectacles keep children's eyes from growing—they stay almost one thing to suit the specs; then that person must wear them always, and, worse still, spectacled parents are apt to have spectacled children. Children can and must be educated without ruining their eyes.

"The new gun demands perfect eyes, perfect nerves and absolutely perfect physical and moral courage. The Mauser shuts out all of the old emotional rages that were once so valuable in close encounters; almost disarms the heathen and the cunning weak, is civilization's instrument, striking straight from the highest brain and eye. The flaws in a man or nation will be shown by this searcher of men. The soldier must have strong moral convictions. Shaky souls can never aim the small bore."

MOBILITY vs. INVISIBILITY.

IN the discussion following M. de Bloch's last lecture before the Royal U. S. Institution and in reply to the lecturer's pessimistic views as to the future of cavalry (published in the last number of this Journal).

Colonel F. J. GRAVES (late commanding 83rd Regimental District), said: His Excellency has, if I may say so—I do not think he will understand the English idiom—simply wiped the floor with us cavalry. His Excellency has paid high and heart-felt compliments in the tribute to the bravery of our British officers and soldiers in the Transvaal, and, as coming from a Russian, I am perfectly sure I only express the feeling of the whole audience in saying they are deeply grateful for the way in which he has expressed himself. The paper is most interesting. The

books upon which this paper is based are more interesting still, because fuller, and I think they deserve the close attention of all ranks of our Service. But when we come to the paper of to-day I take leave very humbly to differ very seriously on certain points put forward in it. While I do so, I do not mean to say that I differ with the inner mind of M. de Bloch. The whole trend of this double paper put before us seems to me to be based upon pure and simple ballistics. It takes little or no account of the conditions on the Boer side with regard to the country and so on, and the conditions on the British side. It is based purely and simply on the value of long-range firing, flat trajectory, and the effect of modern artillery and rifle fire as it at present obtains. Now I consider that the lessons to be learnt from the South African War include not only that, but something much further. They include not only the material, but also the qualifications and idiosyncrasies of the *personnel*. May I venture to take up two or three moments of your time by putting this in a short antithesis or juxtaposition? First of all, the Boer was in his own country, with a complete knowledge of the country, a marvellous knowledge of that country, with information anywhere he chose to halt for the night's rest. The farms were depôts of supply, of horses, food, ammunition, etc., and information as well. The British go into a strange country: they have few maps, and most of those very unreliable. They have unreliable information. Supplies had to be carried because the local supplies were uncertain. So much for the conditions; I cannot labour them out. The Boers were mobile, so much so that a small force all being mounted could turn every flank attack we attempted into a frontal attack. The British, on the other hand, for the greater part of the last 18 months were absolutely non-mobile. It is a case of the hare against the tortoise. With regard to the personal idiosyncrasies of the Boer as compared with the British, I do not want to do them any injustice, but I take it that the Boer fights personally to prevent his foe getting at him. The Britisher, I am proud to believe, fights with the view of getting at his foe. The Boer from the time he is 12 years of age is a born stalker. He gets up behind a small rock near the watering place of an antelope, he lies down there, smokes his pipe, lays his rifle, waits till the animal comes along, and then shoots. That is just exactly what he has done with regard to the British soldier. The Boer, therefore, in 99 cases out of 100, fights prone on his face, it is part of his job, it is what he has been taught to do; but the Britisher fights, I am sorry to say, mostly straight upright. Therefore, owing to that one difference between the two classes of men, we find greater losses on the part of the British troops. So much for the differentiation between the two classes of people. You have put down in the first part of your paper that the first lesson derived from the Boer war is invisibility. I agree with that. But invisibility, to my mind as a cavalry soldier, only beats mobility (if you understand my metaphor) by a very short head. I

think one of the chief lessons to be learnt from this South African War is the great value of mobility. I do not err in that; if I do err at all, I err in very good company. Many of you will remember Sir George Chesney's noted lecture here in the year 1874, when he out-Heroded Herod in support of the value of mounted troops. He says:—"Imagine now what would be the effect of 30,000 or 40,000 horsemen—horsemen fit to act together or fit to act alone—men able to ride across country, across any country in Europe, riding to and fro in rear of an army intercepting its communications, cutting off its supplies, destroying its reserve ammunition and material, creating confusion and panic far and wide. Is it not clear that the larger the enemy's army the greater would be its resulting confusion and disorganisation? Such a mode of attack carried out boldly and without fear of consequences or regard to conventional rule would, I believe, utterly cripple and confound an opposition army of vastly larger size. Thirty thousand men in this way might hold in check 300,000." I rather agree with that, but there are some here who may say: "That is all a matter of theory. Have we ever had anything in military history put into practical effect on those lines?" I say we have, and I am prepared to show from one single fact of military history that had those lines been acted upon at the outset of the South African War, very likely peace would have been declared six months ago. I hold in my hand a translation of a Russian pamphlet by B. T. Lebedev, on the invasion of India, in which the author refers to an incident of some importance, which occurred in the year 1801. That was a lucky year; we are now in 1901, which is just a hundred years afterwards. M. Lebedev says:—"In the year 1801, the Emperor Paul of Russia made an attempt to carry out a certain plan of campaign by himself. He proposed to attack and seize India. What did he do? He detailed 22,500 Don Cossacks for the purpose." In autograph letters to the Ataman of the Don Cossack troops, General Oiolor, the Emperor Paul wrote:—"I trust the whole of this expedition to you, and your troops of cavalry; get them together," and so on. Now mark this point. "The troops of the enemy are similar to yours." Let me just give you a little corollary from the second letter he wrote. He put at the end of that second letter:—"If infantry are required, I will send them after you; but it will be better if you can manage with the force at your disposal." I may be heterodox, I may be an utter radical in this matter, but I believe that if instead of having *now* 70,000 mounted troops in the field against the Boers at this late period of the fight, we had begun with 70,000, the result would have been of a very different character. I say, therefore, that when M. de Bloch declares that cavalry are no good, to take his own words, "for irruptions, for reconnaissances, for making incursions into the enemy's country, for attacks of cavalry *en masse* against cavalry, cavalry charges, meetings of cavalry with cavalry, and so on, or pursuit of a flying enemy," I say there is nothing in the South African War, which has been

conducted under exceptional circumstances, which proves his case. I believe that while the action of cavalry in the future may be, and necessarily will be, modified, that they will have a great future before them. I believe that if to-morrow we had twice the number of cavalry out at the front—mark you, well-horsed and not over-weighted—I believe the war would be over in the snuff of a candle. Let me give you one little instance of the action of cavalry in an attack, that came to my personal knowledge from one of the men that I was fortunate enough to select to go out with some of my Imperial Irish Yeomanry. At a place called Koonat, Captain Moore, of the 60th Company of Ulster Yeomanry, had a squadron under his command. He was going out as the flank defence of a large convoy. A commando of Boers about 300 in number, was located on a kopje at this place, Koonat. What did he do? From a cavalry point of view, I think he did quite the right thing. He happened to know the country well, for he had been over it several times, so that he had that advantage. He opened out his men, twenty yards from knee to knee, they took up all four reins; they sat down and they rode like demons. They swept over the kopje, took a number of the Boers prisoners and the whole of their wagons, and only lost one man wounded and one horse killed. After all, we must remember that cavalry is an arm of opportunity, and when these opportunities are grasped and taken hold of and used in the right way, I say that the sunset of cavalry has not come yet, but that it is in its full noonday.

Major-General C. E. WEBBER, C. B. (late R. E.) :—The appropriateness of His Excellency M. de Bloch's lecture to this audience and to this Institution would be doubtful, were it not that the whole essence of our public training is to listen to the other side. This Institution is essentially a place in which we study war; our respected lecturer's motive is to try and show that the game is "not worth the candle." * * * The two papers I have read this year before the Institution will, I think, exempt me from being classed amongst what M. de Bloch describes as the "military routinists." Very soon after the invasion of the Colonies I wrote publicly as follows, to try and demonstrate that :— "The result of the so-called 'mobilisation' of horse, foot, artillery and engineers, in the 'regulation' proportions of each arm, was quite unsuitable for the conditions by which (with all the knowledge of the past in our records), when war became inevitable, the country was faced in October of 1889; and that a *mobility* of the rifleman, inferior to that of the enemy, had been the underlying and disabling factor in the case of every failure or check which had up to that time occurred in the operations for the defence of the Colonies and the relief of the invested places." Let me ask M. de Bloch to consider that, if the British foot soldier's average rate of movement is 1, that of the Boer on his horse is 2, and that the day's average march at $2\frac{1}{2}$ miles an hour of the former is 10 miles, while the Boer can move at the rate of 5 miles an hour over 20 miles of ground. Simple

arithmetic shows that the latter has an advantage, individually and collectively, of 4 to 1 over the former, until only the bayonet separates them. When the history comes to be told we shall find this deficiency in mobility in the largest proportion of our troops, in comparison with that of the majority of the Boers, has told on every occasion when they have been in touch. Our generals were forced to attack positions because they could not mask, turn, or ignore them. And these were positions which the mobility of the Boer enabled him to occupy, change his front, or abandon, at his pleasure. In European warfare, when the relative proportions of the three arms is somewhat similar in the opposing armies, if infantry at heavy sacrifice captures a position from infantry, they reap some reward. In this war the result was comparatively insignificant. The value of each arm and its preponderance in Europe varies slightly with the conditions of country and of organisation, but there is no example in which all the infantry is mounted, and all the cavalry is mounted infantry. The conditions I have described, would have existed, with every European Army, no matter whether French or German, Italian or Russian, that had to be sent across 6,000 miles of sea to carry out the same task. My hearers will therefore understand, I claim, that the standpoint of M. de Bloch's view has a very defective foundation, and that the ground for his conclusions is equally unsteady. Let us take No. 2 of his subjects on the *constant impossibility of determining the enemy's position*, and his attributing the *failure of the reconnaissances to the new conditions of war*. This impossibility and this failure were due solely to the superior mobility of the *gros* of the Boer army (if we can call it a *gros*) in their own country with horses accustomed to work and live on the veldt. This constitutes no "new condition of war" using our lecturer's own words. It is much to be regretted that he did not complete his study by a visit to South Africa. I have stated elsewhere, that both as regards natural (geological) and artificial (houses, fences, enclosures, villages) features, there is only the remotest resemblance between South Africa and Europe, the greater the civilisation in the latter Continent the remoter it is. Where did he get his information, namely * * * *, that "the greater part of South Africa is, compared with much of Europe, absolutely flat"? But, to return to the question of *mobility*, whether on the flat or on the mountain side, South Africa is the ideal country for warfare with mounted riflemen, especially if man and horse belong to the country. European infantry organisation is out of place, except for the defence of towns, posts, and lines of communications. It was *only* their mobility, added to their knowledge of the country, that enabled the Boers to effect surprises and captures during the early stages of the war. How blind the best students of war throughout Europe have been to these conditions is a poor excuse for the misunderstandings, misrepresentations, and reports as to our Army, with which Europe has been flooded for the last two years. I do not support M. de Bloch when he says "the same mistakes and want of fore-

sight which we have seen among the British would have been reproduced by the Germans," because I believe that with the German military system, if it had been possible to have brought about the same situation that exists in South Africa after a century of German rule, our neighbours would have had man for man, a mounted rifleman, ready to take the field, with which to meet the Boers. But if any Continental Army had faced the Boer invasion under the same conditions namely, riflemen on foot against riflemen on horses, the statement our friend quotes (and repudiates) namely, "any Continental Army would have beaten the Boers long ago," only proves the ignorance of those who made it. * * * These critics do not the least understand that if Baden-Powell could have maintained 500 mounted riflemen in Mafeking, he would never have allowed the Boers within 10 miles of the place. In subject No. 6. M. de Bloch commits himself to "the essential," and he calls it *invisibility*. If he had written *mobility* he would have shown that he understood his subject better. There is not a single little war in which our Army has not dressed and equipped with *invisibility* in view. It is common knowledge with us. In the same part of his lecture headed "frontal attacks," he says the Boers had "no training." On the contrary, I say, they were, in their capacity of mounted riflemen, as nearly the makings of George Chesney's "invincibles" (described nearly 30 years ago in this room) as could be. Contradicting himself under heading No. 7, he calls the Boers "soldiers by birth." He couples with this their use of cover (I will not call them trenches), and continually refers to their "entrenchments," yet, he says, they had "no training." It was *only* their *mobility* that enabled them to mislead reconnaissances, to shift their line of defence with rapidity, to disperse and concentrate at points on that line, to occupy, or not occupy, their so-called entrenchments until the last moment—in fact, to follow tactics, denied to riflemen on foot in a primitive country when the opposing riflemen are mounted. One more word in defence of our "Regular Army." M. de Bloch lauds the civilian, the amateur, the colonial troops, but he tries to prove too much. Why did he not get at the fact, namely, that the "Colonials" and the "English Yeomanry" were all mounted as soon as they landed? Of course, against a swarm of mounted riflemen, to use his expression, they "were infinitely more useful than the Regulars." Yes, possibly, so long as those Regulars had to toil on foot. But does he know that we have had 10,000 mounted "Regular" infantry in the field, besides these Colonials and Yeomen? And that the work of Lord Roberts' forced marches and crushing blows would have been absolutely impossible without our cavalry and the mounted infantry? And does he know that although few in number, our cavalry acted practically as mounted riflemen, and, as rapidly discarded the rôle of the *sabreur* as they will, no doubt "under regulations" have to re-adopt it when they return to Europe? * * *

In closing the discussion, the Chairman, Major General Maurice, re-

marked that all that M. de Bloch has said may be perfectly true as regards some of the detail of the criticism that he has offered in reply to Colonel Graves, but I think we cannot, any of us, forget the cry of indignation that was raised against the expression "dismounted men preferred." There has been so strong a feeling throughout the country that mounted men were a necessity, that I think there are a good many of us who are inclined to agree with Colonel Graves that had 70,000 mounted men been sent out to South Africa in the earlier stages of the war, we should have had a very different scene from what we have had in the actual war. I may venture also to say that two of the most brilliant episodes—I do not think they were those which Colonel Graves mentioned—of the war were actual cavalry charges, the one that of General French in the march to relieve Kimberley, which was a decision of the moment, quite as completely a sudden cavalry move as any that was ever made in war, in which he broke through the Boers and succeeded in forcing his way when nothing but a cavalry charge would have done it; and the other, curiously enough, on the opposite side by De Wet himself, who, though he had no proper cavalry, yet did use his men as cavalry in the proper sense of the term at the time when he broke through all our toils thrown completely round him, and when we thought we had him completely netted, did, by an absolute charge, riding as hard as he could go, get right through our lines. Nor can we, any of us, forget how during that anxious time which preceded the arrival of Lord Roberts in South Africa, it was the news which we received from General French and his cavalry force round Colesberg which alone relieved the gloom. I am, therefore, from these experiences, not inclined to think that, even with regard to those parts of the cavalry action which are most doubtful, it has yet been proved that the day of cavalry is gone. It is to be remembered that very much the same conclusion, that the day of cavalry was over, was drawn after the 1870 campaign, and that as a result of it at the end of the war von Moltke enormously increased the German cavalry. Therefore, I think, that we should not be in too great a hurry to accept the conclusions of the lecturer as to the incapacity for their proper work of either artillery or cavalry.

CAVALRY ON THE FIELD OF BATTLE.

GENERAL VON PELET-NARBONNE, the well-known German military writer, has recently published a study on "Cavalry on the Field of Battle" in the *Armee und Marine* from which we quote:—

"In military circles, everyone recognises that the importance of cavalry scouting has enormously increased in consequence of the extraordinary augmentation in the effectives of Armies. Everyone also recog-

nises the utility of cavalry, either for the protection of, or to cut the rear communications, which are so vulnerable nowadays—such as railways and telegraphs. On the other hand, many military men consider that the *rôle* of cavalry on the battle-field is at an end, except when used against hostile cavalry, and thus merely initiate engagements which may be regarded as duels with no object. The circulation of such opinions is due to the fact that, in battles of the past century, cavalry has but rarely been able to intervene efficaciously. It is also because, since the enormous improvement in small arms, it has become exceedingly difficult for cavalry to come into such close contact with the enemy as to make it possible to attack him with the *arme blanche*. Since our last war even greater progress has taken place in armaments. It is, however, probable, that as regards the infantry rifle, improvement has reached its extreme limit, for to fire at still longer distances, and with greater initial velocity, would be useless, if not practically impossible.

"The time of the battles of Hohenfriedberg, Rossbach, and Leuthen, where the cavalry broke up and scattered innumerable battalions, took hundreds of colours and guns, has passed never to return. On the other hand, cavalry may to-day, to a greater extent than ever, direct its energies to scouting duty. At the same time, that arm should not yet altogether abandon the useful and, in certain cases, decisive *rôle* that it is still in a position to play on the battle-field. We propose to demonstrate that cavalry may easily play this *rôle* on the field of battle in the presence of the other two arms. We are of opinion that the deadly effect of small arms, which is the chief factor against the useful intervention of cavalry, is the very thing that gives rise to favourable occasions for that arm to act with effect.

"As everyone knows, the losses in great battles have become, as a general rule, smaller, at first owing to the adoption of small arms, and later to their improvement. The time when the carnage was most terrible was when masses armed only with swords hurled themselves on one another. With the perfecting of small arms the high losses produced at certain points of the battle-field have had a more decisive and more sudden influence, a more disconcerting moral effect. On the other hand, the losses sustained on the whole field of battle have been relatively small. These losses that occur at certain points during the space of a few moments only, shake the *moral* of the troops far more than higher losses extending over the entire period of action. A body of infantry thus shaken would fall an easy prey to cavalry. Fritz Höning describing, after the battle of Vionville, the retreat of the brave 38th Infantry Brigade, where he himself was wounded, says:—'At such a moment it matters little whether soldiers are armed with repeating rifles, flint muskets, or with pitchforks. A bold charge of two squadrons and not a man would have escaped.' It goes without saying that soldiers with no experience of war, such as they have now in all European Armies, would not go through such a crisis with the same

coolness as professional soldiers who have smelt powder. If the flatness of the trajectory of the modern rifle could be increased, it could only become possible by reducing the calibre, which has now reached a limit far smaller than formerly when the French said that 'the rifles do not kill.' In any case, if the small projectile kills more slowly, and if the wound received by a horse during the charge is only felt after some minutes, it must be remembered that that horse continues to carry his rider towards the enemy at the rate of 700 yards a minute. The manner in which infantry break up in action also affords a favourable chance for a cavalry charge. The *schützengeschwärz* (swarm of skirmishers) is the normal infantry fighting formation, whilst units in close order, forming the supports, are always at some distance from the firing line. Long lines of skirmishers, which get thinner and thinner during an action, cover the battle-field. Whilst the *moral* of the men is not shattered these lines are quite strong enough to repulse a frontal charge; but, on the other hand, the flanks and the rear being sensibly weaker than at the epoch of column tactics, soldiers may easily lose their heads and disperse. The infantry of Imperial France was, without doubt, brave and valiant, although not so well disciplined as that of Germany; nevertheless, when at Vionville, the 1st Dragoons of the Guard delivered its charge, the men of the 13th and 43rd Regiments of the Line were so panic-stricken that they fired on one another. It is probable that the greater portion of the losses suffered by these two regiments was owing to this want of coolness. If cavalry wishes to successfully attack infantry it must form many echelons, and deliver successive charges, and, if possible, from many directions. Only a charge delivered under these conditions can succeed; the last echelons will merely complete the work of destruction initiated by the first.

"If we consider cavalry action against artillery, we must at once admit as an established fact, that even in 1870-71 the German batteries were able, thanks to their training and to the efficacy of their projectiles, to repulse, with their fire, all frontal charges discovered in sufficient time. Since that period the efficiency of guns has still further increased, and a strong line of batteries can certainly cover such a zone of ground with its fire that a frontal cavalry charge becomes practically impossible. It is otherwise if the frontal charge is favoured by the nature of the ground or carried out as a surprise, if it is combined with another flank charge, if it is directed entirely on the flanks or on the rear, or, finally, should the cavalry appear obliquely with regard to the position of the artillery. In the present day the action of infantry is prepared for by as strong an artillery fire as possible, so that the former frequently push on without sufficient support; such tactics allow the cavalry to effect a surprise. Experience has shown that bodies of men on the battle-field have all their attention absorbed by the adversary immediately to their front, with whom they are fighting, and that they observe nothing except that adversary. It is to this fact that the taking of the great battery of

Tobitschan on the 15th July, 1866, was due ; the latter, which had only a weak support, was fighting the horse artillery batteries of Hartmann's division, and did not perceive, until too late, the charge of the cuirassier regiment. Every line of batteries when charged obliquely, on the flank or on its rear, finds itself in a far worse position than the other arms, because it can only execute changes of front with difficulty and with great loss of time. Further, oblique artillery fire only gives mediocre results. Cavalry may thus be regarded as the most dangerous enemy to field artillery. It is true that it would frequently be unable to carry off the captured guns, but, nevertheless, it would be able at any rate, to produce such disorder in the batteries that the latter would find it impossible to re-open fire for some considerable time. A cavalry charge should not only be judged according to the material results achieved by it ; cavalry frequently attains its object by merely threatening a charge. A charge that has been repulsed may, all the same, be of use ; our Infantry Drill Regulations practically says that cavalry may regard itself as having obtained a success over infantry 'if it succeeds in stopping the advance of the latter, or obliges it to take up such a formation as destroys the proper efficacy of its fire.'

" Amongst the charges that were repulsed, but which, nevertheless, gave advantageous results, may be cited that of the Austrian cavalry at Königgrätz. That cavalry hurled back the Prussian squadrons on their own infantry ; the Prussian cavalry obliged to cross the bridges, did so singly and in disorder, and so compelled its infantry to halt. Thanks to that charge, the retreat of the Austrian Army on the Elbe did not degenerate into a catastrophe. The 52 squadrons engaged lost 72 officers, 1,258 men, and 1,902 horses (25 per cent. of the total horse effective, which was 7,000). The same applies to the charge of Bredow's brigade, which assured victory to the Prussians. The regiments of that brigade were compelled finally to withdraw in disorder, and lost 55.7 per cent. of their effective. That charge would undoubtedly have ensured the entire rout of the enemy, if, instead of being delivered by 6, it had been delivered by 30 squadrons formed in many echelons, which could have hurled themselves successively on the French. On the same day the 1st Dragoons of the Guard, by delivering a charge, saved the remains of Wedell's brigade, which was in flight, as well as the Berendt battery of the 10th Artillery, which was unable to change position. These three squadrons lost 17 officers, 121 men, and 246 horses. These examples prove to us to what use cavalry may be put on the battle-field if properly handled. Unfortunately it was not thus in the second part of the 1870-71 campaign, in the course of which the greatest results might have been achieved by making intelligent use of the cavalry. The following are the reasons why cavalry was not more frequently employed :—

1. Our action taking from the commencement a favourable turn, our chiefs saw no necessity to engage the cavalry.

2. The chief commanders of our cavalry, with rare exceptions, did not understand how to properly handle that arm, and consequently lost confidence in themselves.
3. During peace manœuvres false ideas had been instilled into our cavalry as regards its efficiency with the *arme blanche*. It was badly trained in this respect.

"The French cavalry charges at Wörth, Beaumont, and Sedan cannot serve as a basis for our argument because they were merely desperate ventures. Duels between hostile cavalry are necessary; the cavalry of one side should always endeavour to put that of the enemy out of action. It is only after having achieved that result that it can carry out its reconnoitring unimpeded, and can concentrate all its efforts on the other arms. This cannot be properly carried out at manœuvres, for the beaten cavalry after being pursued for a short time come back on to the manœuvre ground, in order that opportunity for instruction may not be lost. It is far otherwise in action. There the beaten cavalry becomes a negligible quantity for the whole day."

ACCESSIONS TO MUSEUM M. S. I.

THROUGH the courtesy of General Clous, U. S. A., the Military Service Institution has been presented with two iron boat howitzers, trophies of two wars (1797-1898). A description of these pieces, furnished by the Alcalde of Trinidad, follows:

(Translation.)

Jose Manuel de Yrarragorri, Secretary of the Common Council of Trinidad, Cuba, of which is President Antonio Cacho y Bonet, Mayor: I certify: that this date the Mayor Mr. Antonio Cacho y Bonet, permitted the Captains of the United States Volunteers, Messrs. Frederick M. Page and James E. Calhoun, to take possession in the name of the Government of their nation on the 3rd of the present month from the Plaza of Trinidad of one small canon of Iron, to send to Brigadier General, of the American Army, Mr. James F. Wade; and the aforementioned Captains desiring a history of the canon which was turned over to them, I will give it briefly, using for this purpose the antecedents and remarks on file in the Archives of this Municipality.

On the 27th day of July, 1797, the inhabitants of this town, sent by Don Luis A. Bassecourt, Lieutenant Colonel of the Royal Army, 1st Lieutenant and 1st Adjutant of the Regiment of the Royal Guards of Walona Infantry, Military and Civil Lieutenant Governor of Trinidad and the adjoining towns, captured flags and canons of the English in a battle fought on land. These English were the crew and armed parties from five landings, which showed themselves in sight of this city since the 19th of July, 1797, and on the 25th attacked the port; but on the 27th were routed and forced to reëmbark. The then Common Council—which styled itself Justice and Regiment—decided to send one flag to the Court of Spain, but it was returned by the Captain General of the Island, Count of Santa Clara, with the information that it would be

difficult to send it to Spain on account of the war with England, and that it should be placed on the Larger Altar of the Church for the stimulation and the glory of the citizens of Trinidad.

This to be sent to Brigadier General James F. Wade, extending the best wishes of the Mayor of the Municipality of Trinidad, December 5, 1898.

(Seal)

The Mayor.

ANTO. CACHO Y BONET.

J. M. DE YRARRAGARRI.



MILITARY NOTES.

THE HORSE "BATACLAN."—Our readers doubtless remember the horse owned by Lieutenant Kees de Nemesker, instructing officer at Saumur. A photograph reproduced by *Armée et Marine* represents this marvelous jumper clearing a table round which some comrades are tossing off bumpers of champagne in honor of the horse and his excellent rider.

The horse "Bataclan" is now eleven years old. He was bought in the market in Normandy when he was four years old for only eleven hundred francs. Without a rider he easily clears two meters. During the season of 1901 he carried off many prizes at Vichy, Clermont and Nimes. The exigencies of the service have prevented his owner, Captain Giraud, of the Colonial Artillery, from securing triumphs for Bataclan in other competitions. But, if the colonial tour of this brilliant officer does not compel him to leave France before next May, we shall have occasion to go to the next horse show to applaud one of the best trained and best ridden horses in the French Army.—*Armée et Marine*.

SOLDIERS AND MARCHING.—Two German experts, N. Zuntz and H. Schumburg, have been making experiments in regard to the effect of marching on soldiers, and have arrived at some remarkable results.

They selected for this purpose five students of the Friedrich-Wilhelm

Institute, in Berlin, instead of trained soldiers, and the reason was because they knew that in modern armies many soldiers are mere recruits, and they considered it more important to study them than to study men that had been thoroughly trained. The five students were equipped as soldiers, and during the experiments they carried the usual baggage.

In regard to the effect of marching on the action of the heart the experts found that injurious results followed whenever the weight of the baggage was increased from twenty-seven to thirty-two kilograms, that the pulse beat with unusual celerity whenever the weight was raised to thirty-one kilograms, and that in eighty-seven per cent. of all cases the heart and liver were affected when marching under a heavy load. Moreover, fatiguing marches under a heavy load produced enlargement of the liver and dilation of the heart. In the five healthy young men, however, these symptoms did not last long—indeed, the dilation ceased the same evening or on the following morning. In marches during cool and windy weather the kidneys were unusually active.

While light marches are refreshing, say the experts, a notable physical reaction is manifest after fatiguing marches. In regard to the consumption of energy the experiments showed that much depends on the manner in which the load is placed on the body, as if it is distributed properly, much less power is required to carry it than if it is clumsily arranged. The experts point out how baggage should be borne and give an array of reasons why it should not be carried otherwise.

In conclusion the experts claim that a light, porous uniform is the best for soldiers on the march. They also point out that bodily injuries, such as sores on the feet, greatly impede men while marching and help to exhaust their strength.

The military authorities in Germany are much interested in these experiments, and it is believed that they will adopt many, if not all, of the suggestions which have been made by the experts.

"AMMONAL" is the name of a new high explosive, claimed to be powerful in its effect and safe in use. The explosive contains no nitrified substance, but is a mechanical mixture of nitrate of ammonia and aluminium. It is less liable to absorb moisture than other powders of its class and keeps well when properly packed.

The explosive is not only a blasting compound for industrial and mining purposes, but also a military high explosive of rare excellence. When used either in mines or in ordnance, both safety and enormous power are obtained. So far as its industrial use is concerned, the most striking feature of the explosive is the total absence of noxious gases, for which reason it is most fit for blasting in pits and quarries.

Picric acid and wet guncotton, explosives most commonly used in shells and torpedoes, require a strong detonator (about 2 grammes of fulminate) for thorough detonation. It is claimed that "ammonal" is the only high explosive which can be brought to complete detonation by a simple black powder priming, producing the same effect as if a fulminate cap had been used. But where a fulminate detonator is considered preferable to a black powder priming, as, for example, in torpedo charges or submarine mines, one gramme of fulminate is all that is required to detonate the charge.

During the course of the year, a series of experiments were made before the officers of the Austian navy, and before a foreign official (Capt. Tulloch of the Royal Artillery, England) in order to demonstrate the high efficiency of "ammonal" for military purposes. From 100 to 500 fragments were obtained by bursting a 12-centimeter steel service shell

(1.21 kg.) with a bursting charge 1300 grammes of "ammonal." It must, however, be borne in mind that the absolute number of fragments obtained signifies nothing, if the proportions of the weight of the charge and weight of the projectile and the nature of the steel are unknown. Experiments made with 10.4 cm. howitzer shells (1.12 kg.) on the proving grounds of the Austrian Ordnance Board within the last two months, in order to ascertain what was the fragmentation in sand and the effect of the firing against earth cover, showed undoubtedly that "ammonal" is much stronger than the Austrian *erasite*, a picric acid compound.

Steel shells were also fired from a 47 mm. Skoda rapid-fire gun against a 30 mm. steel plate, with a 60 grm. charge of "ammonal" and a small black powder priming. Perfect explosion was obtained behind the plate. There was no fuse in the shell, the black powder being exploded by the shock against the plate, and the fire transmitted to the "ammonal" and retarded.—*Scientific American*.

CAVALRY LANCE BOAT.—The Rey lance boat is designed to serve as an improvised means of transporting troops across streams, especially cavalry. Whenever a body of this latter arm comes to a stream without a bridge, ferry or ford in the vicinity it must either swim over and then ride all day wet through, or make a wide detour, or wait for the bridge train to come up. This, however, takes time, and interferes with the mobility of the arm, often its most valuable quality.

The German cavalry is armed with the lance, and this weapon is used in the construction of the boat, together with short, light connecting pieces, forming a frame-work over which canvas is stretched. One boat has buoyancy enough to carry all the men that can get into it, and two combined are, of course, of greater stability, and can be put together in less than six minutes. By the time part of the men have unsaddled the rest can have the boats ready for crossing. The material for two boats can be carried on one pack-horse, and he can follow the cavalry patrol anywhere.

A number combined may be used to transport larger bodies (up to sixty men), and the boats can also be used to construct pontoon bridges for infantry. Of course the lances can be again used as weapons after crossing the stream.

RUSSIAN FIELD GUN.—The new Russian field gun, which has been designated "3-inch rapid-fire gun, model 1900," was manufactured originally at the Putilow works, where 1000 pieces were built. Now that the piece has been definitely adopted, the other works at St. Petersburg and Obuchow are also called into requisition.

Its calibre is 7.6 cm. (3 inches), and, therefore, differs from the German or French guns by but 1 mm. The tube alone weighs 360 kg. (792 pounds), the piece complete 1720 kg. (3784 pounds), about the same as the German pieces.

The carriage is constructed on the Engelhardt system, with elastic ground brake and a folding spade. The pointing can be done so rapidly that in fifty minutes' firing three or four changes of target can be made without any interruption of the firing. Ten shots a minute can be fired. The muzzle velocity is over 610 metres (2001.6 foot seconds). The shrapnel weighs 6.15 kg. (13.63 pounds), and contains 300 10-gramme hard-lead bullets. The limber carries thirty-six rounds.

The harness and saddle of each horse weigh 140 kg. (308 pounds), but extensive experiments on this subject, and on ammunition packing and its supply, are to be made during the next grand fall manœuvres.

THE PRZEWALSKI HORSE.—Some twenty years ago Pollakoff described a new species of wild horse discovered in the deserts of Mongolia by the late Col. Przewalski. The animal appeared to be intermediate between the domesticated horse and the wild ass; for a long time however, only this single example was known, and naturalists were uncertain as to whether it was really a distinct species or only a hybrid. A writer in *Nature* states that the question has finally been settled by the importation of a drove of colts of the species, which Mr. C. Hagenbeck of Hamburg secured for the Duke of Bedford. The animals are now at Woburn Abbey, where the writer of the article examined them. They are, he says, undoubtedly examples of a new species. In general appearance they are more like ponys than donkeys, and, judging from their build, will never grow very large. The ears are short. Most of them have white muzzles, dun-colored coats and black forelegs, mane and tail, the mane being at present upright. The hoofs are relatively large, like those of the horse and Asiatic wild ass. There is practically no forelock, and only a faint indication of a dorsal stripe in one or two individuals. Naturalists commonly divide the existing species of horse into two groups; one containing only the horse and the other the asses and zebras. Przewalski's horse undoubtedly belongs in the former group with the horse.—*Exchange*.

MILITARY FARMS.—The military farms which were established in the protected centres of the Orange River Colony twelve months ago are now making a new departure. The farms average 2500 morgen. They were originally intended solely for grazing purposes for tired horses and jaded oxen and for feeding captured stock. They are now being used also as dairy farms for supplying milk and butter to the hospitals, for growing vegetables for the troops and for the raising of forage for transport animals.

To illustrate the productiveness of the Ladybrand district, it may be stated that 180 bags of oats sown last September and just reaped yielded 90,000 bundles, each of eight pounds. This product if sold at the lowest local market prices would realize 4d. per bundle. If retailed in Bloemfontein it would fetch from 1s. 6d. to 2s. The actual cost of the labor of ploughing, sowing and cutting would not exceed £120.—*Cable to N. Y. Sun.*

SIAMESE MOUNTED INFANTRY.—Not long ago a French explorer, M. Charles Meissen, in travelling through Siam observed a species of small gray ants which were new to him. These ants were much engaged in travelling; they lived in damp places and went in troops. To his surprise he noticed among them from time to time an occasional ant which was much larger than the others and moved at a much swifter pace, and each of these larger ants, M. Meissen saw, always carried one of the gray ants on its back. This discovery led him to watch their movements closely. He soon saw that while the main body of gray ants was always on foot, they were accompanied by at least one of their own sort mounted on one of these larger ants. He mounted and detached himself now and then from the line, rode rapidly to the head, came swiftly back to the rear, and seemed to be the commander of the expedition. The explorer was satisfied from his observation that this species of ant employs a larger ant—possibly a drone of the same species, though he had no means of proving this—as we employ horses to ride upon, though scarcely more than one ant in each colony seems to be provided with a mount.—*St. James Gazette*.

Comment and Criticism.

“Some Diseases that Attack our Animals.”

Major L. A. Craig, 15th Cavalry, U. S. A.

This paper will be read with interest and satisfaction by officers charged with the care of public and private animals in the Philippines.

In Bataan province a disease Surra was diagnosed by a veterinary surgeon as glanders, and a number of mules and horses was shot before the error was discovered. No serious cases recovered, however, partly because lack of skillful treatment and proper medicine.

The other diseases described prevail there generally, and the causes, means of prevention and treatment, will be extremely useful reading.

“Some Army Defects.” *

Captain John Bigelow, 10th Cavalry, U. S. A.

As Captain Steele says, if a company commander require more of his company than is required by the other companies at the post, his men “are discontented, and justly.” The captain concludes that “the post commander must accept the responsibility for the instruction, deportment, manners, and dress, of his command.” But if a post commander require more of his men than is required by the commanders of other posts in the department, would not a similar dissatisfaction arise in that post, and the responsibility have to be shifted to the department commander? If again, a department commander should make the service in his department harder than it is in other departments, would not the men of that department avoid reënlisting in organizations stationed in it, and thus call for a transference of responsibility from the department commanders to the commanding general of the army or the War Department? A commanding officer can raise and maintain the standard of his command above that of other like commands, only within certain limits. These limits are determined mainly by the knowledge which a command possesses of what is going on in other like commands. The margin is greater in the case of a post commander than in that of a company commander, and greater in the case of a department commander than in that of a post commander. With the advent, however, of grand manœuvres, or field exercises on a large scale, the assembling of troops from neighboring posts and departments, will narrow these margins more or less, and correspondingly increase the responsibility of

* See Nov. number of JOURNAL M. S. I.

the War Department in this matter. But the War Department cannot put the standard above the top notch formed by public opinion. This consideration brings out the importance of popular military education, apart from the liability of a citizen to be called upon for military service, and leads to the conclusion that there is no absolute responsibility for military efficiency except in the people.

I think that our non-commissioned officers might be appreciably improved without lengthening their service, by giving them better training or education; and that their reënlistment might, to some extent, be stimulated without increase of pay, by providing them better quarters and allowing them more privileges, also by the introduction of a system and thoroughness in our military training, which should accentuate the difference between non-commissioned officers and privates, and increase the importance and dignity of the office of a non-commissioned officer.

I am not in a position to know what the staff may have to say on this subject; but viewing it from the standpoint of the line alone, I am in favor of the abolition of extra duty pay, if this is necessary to increasing the pay of non-commissioned officers. I cannot say that I would diminish the reënlisting among privates, if it is to entail a corresponding increase of the labor involved in breaking in recruits. Unless our recruiting system is improved in this respect, I should not favor the abolition of longevity pay. Money might be saved to advantage for increasing the pay, and improving the quality of our non-commissioned officers—at least in the cavalry—by reducing their number. I should say have only six corporals instead of eight, and have two lance corporals instead of one; a lance corporal to hold his appointment not to exceed six months, instead of three, the appointment to be renewable for the same period. According to the regulations (paragraph 287) the appointment as lance corporal is "To test the capacity of privates for the duties of non-commissioned officers," I think it should have the additional object of fitting those of approved capacity for the performance of those duties.

Manzanillo, Cuba,
December 14, 1901,

Reviews.

Reflections on the Art of War.*

THIS is the third edition of a very scholarly work on a very ancient subject which never grows old and is always interesting ; and when one has never seen either of its predecessors it presents itself to him with all the freshness of a first edition.

It is held by many profound thinkers that great generals are born, not made ; and when one considers that to be great they must be able to diagnose with reasonable accuracy the intentions, hopes and fears of their adversary, he can hardly help accepting the idea. It is not easy to see how familiarity with books could help them in their diagnosis. Of course, great generals will read history ; but they read it as critics and not as students. They have acquired the principles of their art in a mysterious way over which they exercised no control, and they read history to note and criticise the application of these principles. A great general is a genius. His success is held to prove it, and few students care to analyze the evidence. Still, the question, What was the secret of his success ? is an interesting one. Of course, many elements would enter into the answer ; but the keynote of the whole would be, his ability to diagnose his adversary's intentions, hopes and fears. An accurate diagnosis on these points gives a general an immense advantage. He can play upon his adversary's hopes and fears and frustrate his intentions at will, and so distract his attention that preparations for the decisive blow can be effected without discovery.

But great generals are rare. The vast majority of commanders must be classed as Kriegsspielers—respectable practitioners, but not geniuses. They learn the rules of the game and follow them. They know nothing of their adversary's cards until he plays them, and then they are surprised—that is, if they are playing against a genius. The author seems to think that study, peace practice and war experience will make a great general of any intelligent man with the necessary courage, moral and physical. That is a mistake. But capital Kriegsspielers can be made in that way.

As an illustration of the idea that great generals are born, not made, the case of a certain Confederate cavalry leader is in point. He commanded a division of irregular cavalry during the American Civil War, and was generally successful in his undertakings. He was an illiterate man, and certainly had never seen a book upon the art of war. But he was guided by a solitary principle which one readily recognizes as the art of war reduced to its lowest terms. He is reported to have said in explanation of his successes, "I have only one rule, and that is to be there first with the mostest men." The soundness of his strategy may excuse the lameness of his grammar. He was in complete accord

* *Reflections on the Art of War.* By Major General Sir Reginald Clare Hart, V.C., K.C.B.

with Napoleon, who said, "The whole art of war consists in being strongest at the decisive point." (138.)

The author seems to think that the believers in born generals hold that they, the born generals, can win victories with any mob of men for an army. Nobody believes that. Even the genius needs the tools of his trade, and they must be in good order. His army must be trained and disciplined. His assistants efficient and instructed. The preparation of the tools is important work, but it is not the art of war. The art consists in the proper use of them. But the author is perfectly fair. Opinions of recognized masters are quoted on both sides of the question.

The chapter on "The Fortune of War" shows that all great generals have been superstitious. And it is not surprising that they should be so. No man has ever witnessed a panic among troops and escaped the conviction that there is an invisible factor in the problems of war, and that it alone decides the issue.

Under the caption "Moral Effect in War," the author discusses courage in all its phases, citing profusely the opinions of great generals, ancient and modern, on the subject. Man is naturally a fighting animal, but when he operates in masses his animal courage must be qualified by cohesion, which is the child of discipline. But the most mysterious kind of courage on the battle-field is that imparted by certain leaders, who are able to put their men into a condition akin to hypnotism.

The short chapter on Strategy and Tactics contains nothing new, and that on The Offensive and Defensive does not contemplate the effect of smokeless powder. Perhaps the chapter was written previous to 1894, and smokeless powder had not then manifested its disturbing effects on their relative advantages.

The discussion of The Offensive, Advanced Guards, Pursuits, Retreats and Rear Guards, follows old lines, and calls for no comment, except that the subjects are clearly and concisely presented, and all opinions are fortified by citations from recognized masters of the art.

There is nothing calling for further comment. The discussions of the auxiliary arms, outpost and staff duties, marches and camp sanitation have the flavor of school lectures devoted to the history of has beens. Even the chapter on Mountain Warfare is confined to the discussion of a special case, namely, Mountain Warfare in India.

When one reaches the end of the volume he feels that he has been conversing with a very learned soldier, a professor if not a master of the Art of War.

JAMES CHESTER,
Major of Arty. Retired.

Heath's Memoirs.*

Major General William Heath was born in Roxbury, Mass., in 1737, and brought up a farmer. He states in his Memoirs that "From childhood he was remarkably fond of military exercises, and as he arrived at years of maturity he procured and attentively studied every military treatise in the English language. This acquainted him with the theory of war in all its branches and duties, from the private soldier to the Commander-in-chief." He learned the practical duties of a soldier when he enlisted in 1765 a member of the Ancient and Honorable Artillery Company of Boston, and was soon thereafter promoted

* *Memoirs of Major General William Heath*. Edited and published by William Abbott, 281 Fourth Avenue, New York.

to the command of a company of militia. In 1770 he commenced his addresses to the public over the signature of "A Military Countryman." In anticipation of the approach of hostilities with the mother country he urged in these addresses the importance of military discipline and skill in the use of arms as the only means that could save the country from falling a prey to an invader.

The first Provincial Congress of Massachusetts appointed a Committee of Safety, of which Col. Heath was a member. In 1775 this same Congress appointed Col. Heath a general officer; and later this same year, when George Washington was appointed Commander-in-chief by Congress, William Heath was appointed fourth Brigadier General; and August 11th, 1776, he was appointed a Major General in the Army of the United States; and held that position until June, 1783, and until the signing of a Treaty of Peace and the disbandment of the army. In his Memoirs he states that "It is a little remarkable that our General (as he always speaks of himself), by whose orders and under whose direction the first guard in the American war was mounted at the foot of Prospect Hill on the evening of April 19th, 1775, after the battle of that day, should, in the course of service, be the last general of the day in the American army to inspect, turn out and visit the guards." At the first period the roads were full of Militia pressing to Boston; and at the latter one they were filled with veteran soldiers returning from the field to their peaceful abodes.

Washington wrote Heath, on his departure from the army, at which time he was next in rank to Washington, a very complimentary letter.

It could not be otherwise than that the memoirs of a man who had been entrusted with such varied responsibilities, extending throughout the entire period of the Revolutionary War, should be interesting and valuable. It is said that the particular advantage of memoirs is that they admit of all subjects, however numerous, and all incidents, however various, which one can desire to insert; and they are not subject to the burden imposed upon a history of continuing the narrative through dry generalities with which even the writer finds himself disgusted.

These Memoirs are an almost daily journal of the events of the Revolution from beginning to end. As Heath was almost constantly in command of the Department of the Hudson, which Washington regarded as only second in importance to the command of the army, the Memoirs are naturally very full of events on both sides of the river.

The correspondence between Heath, Burgoyne and Phillips, when the "Convention troops" were quartered in Boston, under Heath's command, is particularly interesting. It shows "our General" to have been well qualified for his responsible post. He seems to have been always popular with those with whom he had to deal—except Phillips—as appears from the letters of Burgoyne, Rochambeau, Major Harnage, the authorities of Boston, Albany, etc.

The book is enlarged by the addition of the rare pamphlet published by Charles Coffin, Saco, Maine, in 1831, comprising the story of Bunker Hill as told by Dearborn, Wilkinson and Henry Lee. Portraits of the first two, and three of Heath himself, add to the interest and value of a book heretofore rarely met with outside of collectors' libraries, and which in its present dress of good type, paper and binding will be welcomed by all students and those libraries which rarity of the original edition, published in 1798, and only now republished, has prevented from acquiring it.

J. W. REILLY, Lt.-Col. Ordnance.

Pennypacker's "General Meade."

Lieut. Colonel H. H. Humphreys, in a pamphlet of sixteen pages, criticises somewhat severely, Pennypacker's Life of General George G. Meade.* The keynote of the criticism is that Pennypacker in eulogizing his hero, attributes to him much that properly belonged to his Chief of Staff.

No one who served with the Army of the Potomac can doubt the ability and energy of General Humphreys, or forget that while Chief of Staff of that army, he was generally recognized as the Mentor of the General-in-chief. He was credited with doing the thinking for the Army of the Potomac, and planning its movements and campaigns. And yet his guiding hand was nowhere conspicuous. He was modest as well as able and brave. Naturally enough, therefore, the General-in-chief got all the credit for successes which were organized and sometimes executed by his Chief of Staff.

The relations between an Army Commander and his Chief of Staff are so confidential, that neither the historian nor the eulogist can safely step in between them. But the duties of a Chief of Staff are known, and the ability and energy of General Humphreys are also known, and that he fulfilled the functions of his office has never been questioned, and is not likely ever to be.

The facts and citations collected by Colonel Humphreys and spread on the pages of his pamphlet, are generally to the point, and sufficient for his purpose. But they go to prove what nobody denies. If the eulogist of General Meade neglected, occasionally, to give credit where credit was due, and sometimes crowned his hero with laurels which rightly belonged to another, perhaps the fact that he was writing as a eulogist should excuse him.

Some of the criticisms advanced, as for instance, Meade's failure to destroy Lee's army after Gettysburg, have the advantage of having been made after the event. The backward look at a battle or campaign, shows every blunder in bold relief, and makes the proper movements stand out so clear and distinct, that one is always astonished how they could have been overlooked.

There are some new incidents introduced which, although unvouched, are so characteristic of the Meade temper, that one feels inclined to accept them. Meade may, likely enough, have tried "To bully the Chief of Staff" (6) into his own way of thinking. But any one who knew General Humphreys will not be surprised to learn that he failed.

But the most glaring defect in the command of the Army of the Potomac at this time, seems to have been a want of will, or a want of power, to punish blunderers. Cases of this nature particularly referred to are :

1. Dilatoriness of the commander of the 3d Corps at Manassas Gap.
2. Failure of the cavalry commander to report the crossing of the upper Rappahannock by Lee's army. (6)
3. Failure of the commanders of the 3d and 5th Corps to obey their orders at Bristol, whereby the safety of the 2d corps was endangered.
4. Failure of the commanding officer of the 3d Corps to find his way in the Wilderness. (8)

One would not like to pass judgment upon, or even admit the existence of such grave failures without an exhaustive investigation. Still a General-in-chief, convinced of the unreliability of any corps commander, should not hesitate to relieve him from command of his corps. Success should never be

*See "Reviews" JOURNAL M. S. I. Sept., 1901.

sacrificed or even endangered by too tender regard for the feelings of any officer.

JAMES CHESTER,
Major of Art'y. Retired.

Crests and Colleges.

"Official Crests of the British Army Now in Daily Use," is the title of a new pamphlet from the press of Gale & Polden, Ltd., of London. As the name indicates, it is a collection of plates representing the official crests and badges of the different regiments and battalions of the armies of Great Britain.

The plates are full size, in colors, and are both instructive and interesting, illustrating as they do one of the strongest manifestations of that *esprit de corps*, which is so powerful in King Edward's army.

While many of the designs shown are not beautiful from an artistic point of view, yet each is typical of the history of its organization. Together they make a handsome and interesting collection.

"Views of Woolwich and the Royal Military Academy," is a companion pamphlet to "Official Crests of the British Army." The introduction gives a brief description and history of the town of Woolwich and the Academy or "Shop," as it is more commonly termed. The illustrations are exceptionally clear and well executed. They include portraits of Maj.-Gen. Sir J. F. Maurice-K. C. B., Commander of the Woolwich district; Maj.-Gen. F. T. Lloyd, C. B., Governor and Commandant of the Academy, and Lieut.-Col. A. M. Murray, Assistant Commandant and Secretary, together with a brief biographical sketch of each.

The other views give a comprehensive idea of the work of the cadets, their surroundings, and the conditions under which they study and work. Not the least interesting feature are the illustrations of the exhibit of ancient guns and mortars. Some of these have histories and others are merely curiosities.

"Photographic Views of Eton College," is another album of half tones recently published by Gale & Polden. Anyone interested in the famous old college cannot fail to find the album instructive. The history and object of "The Kynge's College of Oure Ladye of Eton besides Wyndsore," since it was founded by Henry VI. in 1441, is set forth in the introduction. Some of the points of interest about the college which are treated in the illustrations, are the chapel, head master's house, school rooms, Weston's Yard, Eton High Street, the science workshop, inspection of the College Volunteers, Keats' Lane, the library, the fives courts, the museum and portraits of Head Master Rev. Dr. Warre, the late Assistant Senior Assistant Master A. C. Ainger and H. E. Luxmoore, the present Senior Assistant Master.

C. B. R.

Smithsonian Report—1900.

The special edition of the Annual Report of the Smithsonian Institute for 1900 has been received by our library as a gift from the Institution. The Report of the Institution differs from the ordinary public document in its contents, which are intended to include a popular epitome of recent scientific progress. It is requested that, in furtherance of the aims of the Institution for the increase and diffusion of knowledge among men, "this volume be placed upon the open shelves of your library for consultation and circulation."

The gift is hereby gratefully acknowledged.

Our Exchanges.

Military.

Armée et Marine.—Jan. 26. The Battle of Dikoa. Feb. 2. The Bulgarian Navy. "The "radeau-sac" at Madagascar.

Belgique Militaire, La.—(Dec. 29, 1901) Military Chronicles: *Belgium*: Personal service. The 112th demi-brigade; *France*: Cavalry formations. Jan. 5, 1902. Regimental libraries for soldiers. *Belgium*: Formation of machinist chasseurs and electricians of the artillery service. *Germany*: Cavalry mitrailleuses. *France*: Military music. *Russia*: A new model of the Cossack lance. (Jan 26, 1902) The Eastern Congo campaign. *Belgium*: Officers of the reserve. First effect of the new military law. Gendarmerie. *Germany*: Recent tendencies of the German army. *Congo-Belgium*: Situation of the officers of the reserve. *Sweden*: Military reforms: résumé of action of the Artillery, 1901.

International Revue über die Gesammten Armeen und Flotten.—Jan. *Bulgaria*: Cavalry: Reduction of average size of native officers' saddle-horses. —The successful establishment 6th Ind. Cavalry Division—The bringing together of a Pioneer Battalion in peace and to make them mobile. *Germany*: About the use of machine guns in last year's royal manœuvres. *France*: The Cavalry School of Saumur. Change in the present peace force in the French army. *Great Britain*: Formation of two provisional cavalry regiments—Formation of the 4th, 5th and 6th Army Corps—New organizational regulations for fortress and besieging artillery—Experiments with electric targets of a new model—Experiments with heavy automobile freight-wagons at Aldershot. *Holland*: Formation of a railroad and telegraph company in Netherland-India. *Mexico*: The building of two gun boats. *Norway*: The building of four forts on the Swedish boundary. *Austro-Hungary*: Army manœuvres. (Supplement 34—Jan.) Experiments in England with mobiles for transporting heavy loads (with plates)—The German Press and the opinion of the Russian General Sacharow about the artillery of the German, French and Russian campaigns. Importance and employment of modern reserve troops.

Journal of the Association of Military Surgeons of the U. S.—Nov., 1901—Feb., 1902. A large number of original memoirs reports, translations, etc.

Revue d'Artillerie—Dec., 1901; Telemetry without telemeter.—Conferences made in 1767 in an artillery regiment.—Economy of forces and concentration of fires.—The Schneider-Canet artillery at the Universal Exposition of 1900. Diverse notes.

Revue du Cercle Militaire—Jan. 25—Feb. 1.

Revue Militaire des Armées Etrangères—Jan.—Studies of the South African war (1899-1900)—Military schools in Austro-Hungary and their reorganization.—Military events in China (1900-1901).

Rivista di Artiglieria Genio—(Dec., 1901.) How patrols may be formed in regiments of field artillery.—Studies and experiments in the construction of armor cement.

Royal United Service Institution, Journal of the—(Jan.)—The new Russian first-class battleship "Retvizan."—Cycling as an aid in home defence.—The water-tube boiler question in the German Navy.—The Netherland South African Railway Company and the Transvaal War.—(Dec. 1901)—The new French first-class battleship "Charlemagne."—The Transvaal War: Its lessons in regard to militarism and army reorganization.—India: its fighting races and its army.

United Service, The.—Feb.—The lessons of the Boer War.

United Service Magazine, The.—(Jan., 1902.)—Old attempts at underwater war.—Notes on the evolution of infantry tactics.—Training in observation.—Rational rifle shooting.—Feb.—Notes on the evolution of infantry tactics.—Heavy artillery.—The clothing of an army.

United States Artillery, Journal of the—(January-February.)—Report on coast artillery target practice.—Notes on rapid firing field artillery.—A discussion of the errors of the cylindro-Ogival projectiles.

United Service Gazette I.—Feb. 1, 1902.—The Colonies and Imperial Defense—An Australian Navy.

Naval.

Boletin del Centro Naval.—(Nov., 1901.)—Rules for coast firing.—Explosives for the interiors of projectiles

Revista Maritima Brasiliera.—(Nov., 1901.)—Naval Review of November 15th.

Miscellaneous.

American Monthly Review of Reviews, The.—Jan.-Feb.

Annales de la Sociedad Cientifica Argentina—Nov.-Dec.

Current Literature.—Jan.-Feb

Political Science Quarterly.—Dec.

Army and Navy Register; regular issues, to date.

Army and Navy Journal; regular issues, to date.

Seventh Regiment Gazette; regular issues, to date.

Cosmopolitan for January and February.

Century Magazine for January and February.

Monthly Weather Review for January and February.

Medical Record for January and February.

Official Gazette of the U. S. Patent Office, to date.

St. Nicholas for January and February.

The National Guardsman and Volunteer, to date.

Woman's Home Companion, January and February.

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NOTE.—Checks and Money Orders should be drawn to order of, and addressed to, "The Treasurer Military Service Institution," Governor's Island, New York Harbor. Yearly dues include Journal.

Please advise promptly of changes of address.



Gold Medal—1902.

First Prize—Gold Medal, \$100 and Life Membership.

Second Prize—Silver Medal, Honorable Mention and \$50.

I.—The following Resolution of Council is published for the information of all concerned :

Resolved, That a Prize of a Gold Medal, together with \$100 and a Certificate of Life Membership, be offered annually by THE MILITARY SERVICE INSTITUTION OF THE UNITED STATES for the best essay on a military topic of current interest, the subject to be selected by the Executive Council, and a Silver Medal and \$50 to the first honorably mentioned essay. The Prizes will be awarded under the following conditions :

1. Competition to be open to all persons eligible to membership.
2. Each competitor shall send three copies of his Essay in a sealed envelope to reach the Secretary *on or before January 1, 1903*. The Essay must be strictly anonymous, but the author shall adopt some *nom de plume* and sign the same to the Essay, followed by a figure corresponding with the number of pages of MS.; a sealed envelope bearing the *nom de plume* on the outside, and enclosing full name and address, should accompany the Essay. This envelope to be opened in the presence of the Council after the decision of the Board of Award has been received.

3. The prize shall be awarded upon the recommendation of a Board consisting of three suitable persons chosen by the Executive Council, who will be requested to designate the *Essay deemed worthy of the prize*; and also in their order of merit those deserving of honorable mention.

In determining the essay worthy of the prize, the Board will be requested to consider its professional excellence, usefulness and valuable originality, as of the first importance, and its literary merit as of the second importance. Should members of the Board determine that no essay is worthy of the prize, they may designate one or more essays simply as of honorable mention; in either case, they will be requested to designate one essay as first honorable mention. Should the Board deem proper, it may recommend neither prize nor honorable mention. Should it be so desired, the recommendation of individual members will be considered as confidential by the Council.

4. The successful Essay shall be published in the Journal of the Institution, and the Essays deemed worthy of honorable mention shall be read before the Institution, or published, at the discretion of the Council.

5. Essays must not exceed twenty thousand words, or fifty pages of the size and style of the JOURNAL (exclusive of tables).

II.—The Subject selected by the Council at a meeting held November 8, 1901, for the Prize Essay of 1902, is

"THE ORGANIZATION AND FUNCTIONS OF A BUREAU OF MILITARY INTELLIGENCE."

III.—The gentlemen chosen by the Council to constitute the Board of Award for the year 1902 are :

MAJOR GENERAL E. S. OTIS, U. S. A.

BRIG. GENERAL A. E. BATES, U. S. A.

COL. H. C. HASBROUCK, ARTILLERY CORPS.

GOVERNOR'S ISLAND, N. Y.

Jan 1, 1902.

T. F. RODENBOUGH,

Secretary.

Hancock and Fry Prizes.

Extract from the Minutes of a stated Meeting of the Executive Council of the Military Service Institution of the United States, Major General Brooke, V. P., in the Chair, held at Governor's Island, N. Y. H., September 13, 1901.

* * *

Resolved, That the report of the special committee of which Major W. M. Black, Corps of Engineers, is Chairman, be and it is accepted and adopted and the Secretary is instructed to cause a copy of the Report to be published * * for the information and guidance of all concerned.

Report of the Committee.

"The Committee to which the propositions for the establishment of additional prizes for papers upon military subjects of current interest were referred, reports as follows:

* * *

"Second. After due consideration of the other proposition the Committee recommends that with a view to encourage contributions to the Journal of the Institution, and expert discussion upon matters of current interest affecting the welfare of the military service, two new prizes be created, to be named the Hancock and Fry prizes, respectively, in grateful remembrance of the first President of the Institution and of one of its founders.

* * *

"C. *Hancock Prize*, \$50, and Certificate of Award and \$25, and Certificate of Award, to be given for the best and second best original essays or papers, the awards to be made under existing regulations for the Gold Medal, excepting that the papers shall contain not less than 5000 words nor more than 10,000 words, and that but one copy of each paper shall be required from the author; said essays to be critical, descriptive, or suggestive, on subjects directly affecting the military service, which have been published in the Journal of the Institution during the six months ending April 30 of each year and which have not been contributed in whole or in part to any other association, nor have appeared in print prior to their publication by the Institution, nor have been published in the Journal in any previous year, and excluding essays for which another prize has been awarded. The certificate of award to be signed by the President and Secretary of the Institution and the award to be made by a committee of three members of the Institution, not members of the Executive Council, to be appointed semi-annually by the President; the award to be made and announced not later than June 30 of each year.

"D. *Fry Prize*, to be the same as the Hancock prize and awarded under the same regulations for papers or essays appearing in the Journal during the six months ending September 30 of each year, with the announcement not later than November 30.

"Third. It is further recommended that to better fulfill one of the objects for which the Institution was founded, as stated in General Fry's paper in Vol. I, No. 1, of the Journal, viz., the discussion of questions of army reform, a special effort be made to secure from officers of experience short expressions of opinion as to the needs of the service and as to what can be done for the advancement of its best interests. To make such discussions of value, criticisms of existing methods must and should be made, and these should be full and free, avoiding all personalities or criticisms of individuals. To this end the published papers should or should not bear the signature of the writers as may be desired by them, their names however being known to the Publication Committee."

* * *

T. F. RODENBOUGH, *Secretary*.



The Seaman Prize.

MAJOR LOUIS L. SEAMAN, M. D., LL. B. (late Surgeon, 1st U. S. Volunteer Engineers), has founded a prize in the MILITARY SERVICE INSTITUTION OF THE UNITED STATES, by contributing annually

One-hundred dollars in Gold

for the best Essay, subject to be named by himself, and to be approved by the Executive Council.

The subject proposed and adopted for 1902 is:

"THE TREATMENT AND PREVENTION OF TROPICAL DISEASES BASED UPON THE OBSERVATIONS OF AMERICAN ARMY MEDICAL OFFICERS."

The competition is open to all Officers or ex-Officers in good standing, of the Regular or Volunteer Service of the U. S. Army.

Three copies of the Papers on the subject must be submitted to the Secretary of the Institution, to reach his office not later than Nov. 1, 1902. Each Essay must be limited to 15,000 words, exclusive of statistics.

All other conditions will apply as those connected with the Annual Military Service Institution Gold Medal Prize.

The gentlemen chosen by the Council to constitute the Board of Award for the year 1902, are:—

**COLONEL C. R. GREENLEAF, LIEUT.-COL. VALERY HAVARD,
and MAJOR JOHN VAN R. HOFF; all of the Medical
Department, U. S. A.**

GOVERNOR'S ISLAND, N. Y.

Jan. 1, 1902.

T. F. RODENBOUGH,

Secretary.